

Liyuan (Joanna) Hou

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Ph: 412.953.8345 | Rm 307 Utah Water Research Laboratory, 1600 Canyon Rd, Logan, UT 84321

EDUCATION

Ph.D. in Civil Engineering, University of Missouri-Columbia, MO, USA **7/2019**

- Dissertation: *Low Strength Wastewater Treatment Using Emerging Anaerobic Treatment Processes*
- Supervisor: Dr. Zhiqiang Hu

M.S. in Environmental Engineering, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China **7/2014**

- Thesis: *Pathogenic Bacteria in a Human-disturbed Watershed: Distribution, Diversity, and Responses to Environmental Changes*
- Supervisor: Dr. Chang-ping Yu; GPA 3.7/4.0

B.S. in Environmental Engineering, Huaqiao University, Xiamen, China **6/2011**

- GPA 4.2/5.0 (Ranking first)

APPOINTMENTS

Assistant professor, Utah State University, Logan, UT, USA **8/2021-Present**

Research interests fall under two themes:

- Exploring the interactions between microbes and multi-contaminants so that a comprehensive system can be developed to track the transport, source, and driver of multiple pollutants in urban wastewater
- Understanding the interactions like biodegradation mechanisms of pollutants to minimize and valorize waste using microbes

Postdoctoral Associate, University of Wisconsin-Madison, Madison, WI, USA **1/2021-7/2022**

- Identify enzymes for depolymerization and degradation of polystyrene to value-added products
- Design engineered species to produce bioplastic precursors from dairy waste
- Mentor graduate students and write grant proposals as PI or key personnel for corporations & government agencies

Postdoctoral Associate, State University of New York College of Environmental Science and Forestry, Syracuse, NY, USA **9/2019-12/2020**

- Designed synthetic microbial communities that degrade emerging pollutants via integrating current advanced technologies
- Elucidated the influence of microplastics on harmful algal blooms
- Mentored graduate students and prepared research proposals & technical reports

Teaching and Research Assistant, University of Missouri, Columbia, MO, USA **9/2014-7/2019**

- Developed highly efficient anaerobic membrane bioreactors for enhancing low strength wastewater treatment
- Developed anaerobic microbial community with high specific affinity and investigated the relationships between the microbial population dynamics and their responses to varied parameters

- Performed various analyses and simulations including chemical analysis, data analysis, dynamics simulation, bio-decomposition model, BioWin simulation.

Environmental Specialist Intern, Missouri Department of Natural Resources, Jefferson City, MO, USA
5/2017-8/2017

- Managed 20 water pollution enforcement case files for closure
- Implemented compliance with decisions in conjunction with permit holders for water pollution enforcement cases
- Conducted cost analysis for compliance documents and completed case & summary memorandums

Project Manager Assistant, ALCLE Environmental Solutions Inc., Waterloo, ON, Canada
6/2016-9/2016

- Served as a coordinator between North America and China for introducing high-efficiency anaerobic digestion induced bed reactors (IBRs) for commercial food and beverage waste processing
- Generated data sheets compiled from pertinent project cases, conducted local site selection investigations and environmental impact studies

Research Assistant, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China
9/2011-7/2014

- Elucidated the spreading mechanisms, sources, and drivers of antibiotic resistome in urban waters
- Unraveled assembly mechanisms of key ecological assemblages in wastewater treatment plants
- Explored dynamics and interactions of microbial communities and their response to anthropogenic interference in the watershed
- Performed fieldwork including surface water and sediment sampling, and sequencing data analysis

TEACHING EXPERIENCE AND MENTORSHIP

Guest lecture, University of Wisconsin-Madison **4/2022**

- Microbiology 526: Physiology of Microorganisms

Co-Instructor, SUNY-ESF **9/2019-12/2019**

- Instructed the compulsory course in biochemistry: Biochemistry Laboratory (FCH 431/531)
- Prepared lectures, assignments, and exams as well as conducted office hours.

Teaching Assistant, University of Missouri-Columbia **9/2018-12/2018**

- Led weekly labs with 50 students for Fundamentals of Environmental Engineering (CEE3200)
- Prepared course materials including lectures, protocols, graded lab reports and homework

Research Mentor

- Provided guidance for the choice of research topics and the plan of research programs
- Consulted and discussed research progress & academic writing
- Assisted in gaining access to required facilities or research materials for their projects

University of Wisconsin-Madison **1/2021-Present**

- Assisting in supervising and mentoring two Ph.D. students
 - Investigate the influence of microplastics on harmful algal blooms (*Fuad J. Shatara*)
 - Distribution and drivers of potential plastic degraders in landfills (*Damayanti R. Ramos*)

- Mentor students in undergraduate independent projects (*Hailee M. Morrison, Jing Wang*)
SUNY-ESF **9/2019-12/2020**
- Mentored one Ph.D. student in research for two years
 - Enhanced polyhydroxybutyrate production from acid whey through the determination of process and metabolic limiting factors (*Linjing Jia*)
- Mentored students in undergraduate independent projects (*Nhat Quang Nguyen, Ben Michael Irwin*)
University of Missouri-Columbia **9/2015-7/2019**
- Mentored undergraduate students in learning research techniques in wastewater treatment processes
 - *Yiding Wang* (Ph.D. student at McGill University)
 - *Jinshen Chen* (Ph.D., graduated from Georgia Institute of Technology)
- Instructed graduate peer mentors on teaching research techniques (*Mingyue Li*, Ph.D., graduated from Ocean University of China)
Institute of Urban Environment, Chinese Academy of Sciences **9/2011-5/2014**

RESEARCH GRANTS

- **USDA NIFA grant, key personnel** **4/2022-4/2025**
- Partnership: Sustainable bioplastics production by improved microbial biosynthesis and controlled hydrolysis of dairy industry and paper mill wastes mix, **\$747,793**
- **O.N. Allen Soil and Environmental Microbiology Small Grant, PI** **5/2020-7/2021**
- Studying up-cycling of polystyrene to the biodegradable plastic class polyhydroxyalkanoates using environmental microbes
- Competitive internal University of Wisconsin-Madison grant program, **\$3145**.
- **Great Lakes Research Consortium Award, lead writer** **1/2021-7/2022**
- Studying effects of great lakes- isolated microplastics and their associated microbial communities and small molecules on the growth of harmful algal bloom-causing species
- Collaborative grant with K. Yokota (SUNY Oneonta), M. Twiss (Clarkson University), **\$22,669**.
- **NSF Emerging Frontiers in Research and Innovation program, co-PI** **2020**
- Studying removal, identification, selective cascade degradation and upcycling of microplastics in aqueous waste streams
- This high-quality label is awarded to all proposals submitted to the NSF-EFMA office that ranked good or very good but could not be funded from the call budget.

AWARDS AND PROFESSIONAL ACTIVITIES

Scholarships

- Leirno Memorial Award (2022)-University of Wisconsin-Madison
- Returning Student Scholarship (2019)-University of Missouri-Columbia
- Paul Kufirin Memorial Scholarship (2018)-University of Missouri-Columbia
- The third prize scholarship (2011-2013)- Institute of Urban Environment, CAS
- Excellent innovation technology award (2012)- Institute of Urban Environment, CAS
- Outstanding undergraduate thesis award (2011)- Huaqiao University

- Outstanding youth volunteers and league cadres (2009-2010)-Huaqiao University
- National Scholarship of China (2008)-Huaqiao University

Manuscript reviewer

- *Environmental Science Technology, Chemosphere, BMC Microbiology, Chemical Engineering Journal, Colloids and Surfaces B: Biointerfaces, Environmental Science Water Research Technology, Environmental Science and Pollution Research, and Waste Management.*

Certificates

- E.I.T. (Engineer-in-Training) License
- GIS (Geographic Information Science) Certificate

Professional service or outreach

- Departmental representative for Graduate Professional Council (2014-2016, University of Missouri-Columbia)
- Volunteer for Clean Lakes Alliance (2021, Madison, WI)
- Poster judge for the student iPosters at the World Microbe Forum (June 2021, online)
- Current memberships of American Association for the Advancement of Science (AAAS), American Society for Microbiology (ASM), and Chinese-American Professors in Environmental Engineering and Science (CAPEES)

Languages

- Fluent in Chinese and English

PUBLICATIONS

- [1] **Liyuan Hou**, Jiangwei Li, et. al. Storm Promotes the Dissemination of Antibiotic Resistome in an Urban Lagoon Through Enhancing Bio-Interactions. *Environment International* 168 (2022)(IF 9.621)
- [2] **Liyuan Hou**, Zhiqiang Hu, et al.. Performance of AnMBRs treating low strength wastewater with different carbon sources at decreasing HRTs and its linkage to *methanosaeta* with high specific affinity *Environmental Science: Water Research & Technology* (2022)(IF 5.819)
- [3] **Liyuan Hou**, Erica Majumder, et al.. Enhanced polyhydroxybutyrate production from acid whey through determination of process and metabolic limiting factors. *Bioresource Technology*, 342, 12573 (2021) (IF 9.642)
- [4] **Liyuan Hou**, Anyi Hu, et al.. Fecal pollution mediates the dominance of stochastic assembly of antibiotic resistome in an urban lagoon (Yundang lagoon), China. *Journal of Hazardous Materials*, 417(5), 126083 (2021) (IF 9.038)
- [5] **Liyuan Hou**, Erica Majumder, et al.. Conversion and removal strategies for microplastics in wastewater treatment plants and landfills. *Chemical Engineering Journal*, 406, 126715 (2021) (IF 10.652)
- [6] **Liyuan Hou**, Erica Majumder. Potential for and distribution of enzymatic biodegradation of polystyrene by environmental microorganisms. *Materials*, 503, 14 (2021) (IF 2.575)
- [7] **Liyuan Hou**, Anyi Hu, et al.. Urban ponds as hotspots of antibiotic resistome in the urban environment. *Journal of Hazardous Materials*, 403, 124008 (2021) (IF 9.038)
- [8] Marwa O. Elnahas, **Liyuan Hou**, et al.. Bioremediation potential of *Streptomyces* sp. MOE6 for toxic metals and oil. *Polysaccharides*, 2, 47-68 (2021) (IF 4.972)

- [9] Hongjie Wang, **Liyuan Hou**, et al.. Horizontal and vertical gene transfer drive sediment antibiotic resistome in an urban lagoon system. *Journal of Environmental Sciences*, 11-23, 102 (2021) (IF 4.302)
- [10] Jinzhen Ma, **Liyuan Hou**, et al.. Modified fruit pericarp as an effective biosorbent for removing azo dye from aqueous solution: study of adsorption properties and mechanisms. *Environmental Engineering Research*, 27(2), 200634 (2021) (IF 1.22)
- [11] **Liyuan Hou**, Zhiqiang Hu, et al.. Impact of decreasing hydraulic retention times on the specific affinity of methanogens and their community structures in an anaerobic membrane bioreactor process treating low strength wastewater. *Science of The Total Environment*, 739, 140373 (2020) (IF 6.551)
- [12] **Liyuan Hou**, Zhiqiang Hu, et al.. Specific affinity and relative abundance of methanogens in acclimated anaerobic sludge treating low strength wastewater. *Applied Microbiology and Biotechnology*, 104, 291-302, (2020) (IF 3.530)
- [13] Mahmoud Gad, **Liyuan Hou**, et al.. Distinct mechanisms underlying the assembly of microeukaryotic generalists and specialists in an anthropogenically impacted river. *Science of the Total Environment*, 406, 126715 (2020) (IF 6.551)
- [14] Yang Wu, Chung-Yu Guan, Nicholas Griswold, **Liyuan Hou**, et al.. Zero-valent iron-based technologies for removal of heavy metal (loid)s and organic pollutants from the aquatic environment: Recent advances and perspectives. *Journal of Cleaner Production*, 277,123478, (2020) (IF 8.304)
- [15] Philomina Onyedikachi, Azhar Rashid, **Liyuan Hou**, et al.. Elemental contaminants in surface sediments from Jiulong river estuary, China: Pollution level and ecotoxicological risk assessment. *Water*, 12(6), 1640 (2020) (IF 2.554)
- [16] **Liyuan Hou**, Anyi Hu, et al.. Deterministic and stochastic processes driving the shift in prokaryotic community composition in wastewater treatment plants of a coastal Chinese city. *Applied Microbiology and Biotechnology*, 103, 9155-9168 (2019) (IF 3.530)
- [17] **Liyuan Hou**, Anyi Hu, et al.. Deciphering the assembly processes of the key ecological assemblages of microbial communities in thirteen full-scale wastewater treatment plants. *Microbes Environments*, 34, 169- 179 (2019) (IF 3.057)
- [18] Anyi Hu, Hongjie Wang, Xiaoyong Yang, **Liyuan Hou**, et al.. Seasonal and spatial variations of prokaryoplankton communities in a salinity-influenced watershed, China. *FEMS Microbiology Ecology*, 93, (2017) (IF 3.675)
- [19] Anyi Hu, Feng Ju, **Liyuan Hou**, et al.. Strong impact of anthropogenic contamination on the co-occurrence patterns of a riverine microbial community. *Environmental Microbiology*, 19, 4993-5009, (2017) (IF 3.96)
- [20] Anyi Hu, **Liyuan Hou**, Changping Yu. Biogeography of planktonic and benthic archaeal communities in a subtropical eutrophic estuary of China. *Microbial Ecology*, 70, 322-335, (2015) (IF 3.356)
- [21] Lv Min, Qian Sun, Anyi Hu, **Liyuan Hou**, et al.. Pharmaceuticals and personal care products in a mesoscale subtropical watershed and their application as sewage markers. *Journal of Hazardous Materials*, 280, 696-705, (2014) (IF 9.038)
- [22] Anyi Hu, Xiaoyong Yang, Nengwang Chen, **Liyuan Hou**, Ying Ma, Changping Yu. Response of bacterial communities to environmental changes in a mesoscale subtropical watershed, Southeast China. *Science of the Total Environment*, 472, 746-756, (2014) (IF 6.551)
- [23] **Liyuan Hou**, Chang-ping Yu, et al.. Distribution of potential pathogenic bacteria in the Jiulong River Watershed. *Environmental Science (China)*, 35, 1742-1749 (2014) (IF 3.577)
- [24] **Liyuan Hou**, Chang-ping Yu, et al.. Spatial-temporal variation of nutrient concentrations in the surface water and its potential impact on eutrophication in Jiulong river estuary. *Journal of Applied Oceanography (China)*, 33 (3), 369-378 (2014) (IF 0.669)

CONFERENCE PRESENTATIONS

Invited Seminar Speaker

Departmental Seminar for Environmental Engineering, University of Wisconsin, Madison

- *Leveraging Microbial Biotechnology for Assessment of Microbe-Contaminant Interactions and Resource Recovery in Urban Wastewater* (3/2022, Madison, WI)

Forum on ‘Global health: phage therapy and actions for antimicrobial resistance control’ at Hainan International Health Industry Expo 2021

- *Monitoring antibiotic resistome and its drivers in urban aquatic ecosystems* (11/2021, Hainan, China, virtual)

Departmental Seminar for Graduate Institute of Environmental Engineering, National Taiwan University

- *Co-occurrence of Direct and Indirect Extracellular Electron Transfer Mechanisms during Electroactive Respiration in a Dissimilatory Sulfate Reducing Bacterium* (3/2021, Taipei, Taiwan)

Departmental Seminar for Department of Bacteriology, University of Wisconsin- Madison

- *Microbial production of bioplastic precursors from acid whey wastewater* (3/2021, Madison, WI)

Conference Selected Speaker

81st Annual Meeting, North Central Branch, American Society for Microbiology (11/2021, virtual)

- *Enhanced polyhydroxybutyrate production from acid whey through determination of process and metabolic limiting factors*

American Society for Microbiology DC Branch Spring Meeting (2/2020, D.C.)

- *Contributions of Direct and Indirect Electron Transfer Mechanisms in Treatment of Sulfate-containing Wastewater in Microbial Fuel Cells*

Mid-American Environmental Engineering Conference (10/2017, St. Louis, MO)

- *Low Strength Wastewater Treatment Using Emerging Anaerobic Treatment Processes*

Poster Presenter

2021 World Microbe Forum iPoster

- *Co-occurrence of Direct and Indirect Extracellular Electron Transfer Mechanisms during Electroactive Respiration in a Dissimilatory Sulfate Reducing Bacterium* (06/2021, online)

Engineers’ Week Lab Exhibits-Research Day Poster

- *Relative Abundance of Methanogens and Their Specific Affinity in Acclimated Anaerobic Sludge Treating Low Strength Wastewater* (03/2018, Columbia, MO)

- *Performance and Methanogenic Population in Anaerobic Membrane Bioreactors Treating Low Strength Wastewater Containing Acetate or Glucose at Short Hydraulic Retention Times* (03/2019, Columbia, MO)

BUSINESS AND LEADERSHIP EXPERIENCE

Start-up Business Course Certificate

(6/2020)

- Completed 12 weeks NSF Regional I-Corps customer discovery courses
- Led the team to build the business model, interview and identify potential consumers

- Served as the key personnel to submit the SBIR proposal to NIH named “Biologically-derived functionalized polyhydroxyalkanoates nanoparticles for targeted delivery of payload”

Research assistant at International Admissions at the University of Missouri (2018-2019)

- Served one year as the coordinator of all international student ambassadors for admissions activities
- Coordinated international admissions representatives for international recruitments meetings, preparation, and scheduling
- Worked closely with the assistant director of operations and international recruitment in tracking and data collection of applicant reports and being in charge of social media presence through Facebook, YouTube, Twitter and WeChat.