Yanzhe Zhu

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Education

California Institute of Technology 2020.06
Ph.D. in Environmental Science and Engineering. Advisor: Dr. Michael R. Hoffmann

California Institute of Technology 2017.06
M.S. in Environmental Science and Engineering. Advisor: Dr. Michael R. Hoffmann.

Washington University in St. Louis 2014.12
B.S. in Chemical Engineering. Minors: Environmental Engineering Science; Music.

Professional Experience

Postdoctoral Scholar 2021.1 – Present
Department of Environmental Science and Engineering Pasadena, CA
High-throughput enrichment and physiological study of deep-sea microbial symbioses PI: Dr. Victoria J. Orphan

Postdoctoral Scholar 2020.07 – 2020.12
Department of Environmental Science and Engineering Pasadena, CA
Development of a rapid nucleic acid quantification platform for SARS-CoV-2 PI: Dr. Michael R. Hoffmann

Graduate Research Assistant 2016.01 - 2020.06
Department of Environmental Science and Engineering Pasadena, CA
3D microfluidics for environmental pathogen detection and single cell analysis PI: Dr. Michael R. Hoffmann

Graduate Research Assistant 2016.04 - 2017.04
Department of Geology Pasadena, CA
Hydraulic modeling of catastrophic flood on Mars PI: Dr. Michael Lamb

Undergraduate Research Assistant 2014.01 - 2015.05
Environmental NanoChemistry Laboratory (ENCL), Washington University in St. Louis St. Louis, MO
Fate and Transport of CeO_2 Nanoparticles in Presence of Mn(II) and As(III) PI: Dr. Young-Shin Jun

Engineering Consultant 2014.01 - 2014.05
Interdisciplinary Environmental Clinic, School of Law, Washington University in St. Louis St. Louis, MO

Process Technology Intern 2013.05 - 2013.08
SABIC Innovative Plastics Mt. Vernon, IN

Undergraduate Research Assistant 2012.01 - 2013.05
Department of Chemistry, Washington University in St. Louis St. Louis, MO
pH Modeling and Synthesis of Metal Carbonates for Geological Carbon Sequestration PI: Dr. Sophia Hayes

Peer-Reviewed Publications

Google Scholar Profile

[10] **Yanzhe Zhu**, Xunyi Wu, Alan Gu, Leopold Dobelle, Clément A. Cid, Jing Li, and Michael R. Hoffmann. (2021) "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. https://doi.org/10.1021/acs.est.1c04623

- ❖ Selected as the winner of WEF/CDC Challenge for SARS-CoV-2 detection (Non-PCR) in wastewater

[9] Alan Gu*, **Yanzhe Zhu***, Jing Li, and Michael R. Hoffmann. (2021) "Speech-generated aerosol settling time and viral viability predict COVID-19 transmission". *Environmental Science: Atmospheres,* 2, 34-35. https://doi.org/10.1039/d1ea00013f

* Equal contribution

[8] **Yanzhe Zhu**, Jing Li, Xingyu Lin, Xiao Huang, and Michael R. Hoffmann. (2021) "Single-cell phenotypic analysis and digital molecular detection linkable by a hydrogel bead-based platform". *ACS Applied Bio Materials*, 4, 3, 2664-2674. https://doi.org/10.1021/acsabm.0c01615

[7] Chelsea W. Neil, Xuanhao Wu, Doyoon Kim, Haesung Jung, **Yanzhe Zhu**, Jessica R. Ray, and Young-Shin Jun. (2021) "Arsenite oxyanions affect CeO_2 nanoparticle dissolution and colloidal stability." *Environmental Science: Nano*, 8, 233-244. https://doi.org/10.1039/D0EN00970A

[6] Jing Li, **Yanzhe Zhu**, Xunyi Wu, and 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, no. Supplement_2: S84-S90. https://doi.org/10.1093/cid/ciaa498

[5] Xunyi Wu, Xiao Huang, **Yanzhe Zhu**, Jing Li, Michael R. Hoffmann. (2020) "Synthesis and application of superabsorbent polymer microspheres for the concentration and quantification of microbial pathogens in ambient water." *Separation and Purification Technology*, 116540. https://doi.org/10.1016/j.seppur.2020.116540

[4] Siwen Wang, **Yanzhe Zhu**, Yang Yang, Jing Li, and Michael R. Hoffmann. (2020) "Electrochemical cell lysis of gram-positive and gram-negative bacteria: DNA extraction from environmental water samples." *Electrochimica Acta*, 135864. https://doi.org/10.1016/j.electacta.2020.135864

[3] Xingyu Lin, Xiao Huang, **Yanzhe Zhu**, Katharina Urmann, Xing Xie, and Michael R. Hoffmann. (2018) "Asymmetric membrane for digital detection of single bacteria in milliliters of complex water samples." *ACS nano.* 12, no. 10: 10281-10290. https://doi.org/10.1021/acsnano.8b05384

[2] **Yanzhe Zhu**, Xiao Huang, Xing Xie, Janina Bahnemann, Xingyu Lin, Xunyi Wu, Siwen Wang, and Michael R. Hoffmann. (2018) "Propidium monoazide pretreatment on a 3D-printed microfluidic device for efficient PCR determination of 'live versus dead' microbial cells". *Environmental Science: Water Research & Technology.* 4(7): 956-963. https://doi.org/10.1039/c8ew00058a

- ❖ Featured as inside cover
- ❖ Nominated for Best Papers from 2018 in the *Environmental Science* family of journals

[1] Andrew J. Surface, Fei Wang, **Yanzhe Zhu**, Sophia E. Hayes, Daniel E. Giammar, and Mark S. Conradi. (2015) "Determining pH at elevated pressure and temperature using in situ 13C NMR." *Environmental Science & Technology.* 49, no. 3: 1631-1638. https://doi.org/10.1021/es505478y

Awards and Grants

The Winner of WEF/CDC Challenge for SARS-CoV-2 detection (Non-PCR) in wastewater	2022
Caltech Center for Environmental Microbial Interactions (CEMI) pilot grant	2020
Caltech Center for Environmental Microbial Interactions (CEMI) travel grant	2019
Caltech graduate student conference travel grant	2019
Washington University Undergraduate Summer Research Award	2014
Tau Beta Pi Engineering Honor Society	2013
AICHE Donald F. Othmer Sophomore Academic Excellence Award	2012

Invited Talk and Conference Presentations

[10] Flash talk. "High-throughput enrichment of deep-sea microbes". *Spring science symposium celebrating microbes and CEMI's 10th anniversary*. April 2022, Pasadena, CA.

[9] Seminar talk. "Linking single cell phenotype with genotype by hydrogel bead-based platform". *Caltech ESE seminar: Current Problems in Environmental Science and Engineering*. December 2019, Pasadena, CA.

[8] Invited talk. "3D microfluidics for environmental pathogen detection and single cell phenotype-to-genotype analysis". *UCLA Di Carlo Group seminar*. November 2019, Los Angeles, CA.

[7] Flash talk and poster. "Hydrogel bead-based platform for single-cell phenotypic analysis and digital molecular detection." *ACS Publications Symposium: Innovation in Materials Science and Technology*. November 2019, Singapore.

[6] Poster. "Development of a low-cost digital nucleic acid amplification test platform using hydrogel beads for environmental surveillance of *Salmonella* Typhi." Fall Poster Session of *Caltech Center for Environmental Microbial Interactions (CEMI)*. October 2019, Pasadena, CA.

[5] Conference oral presentation. "Development of a disposable centrifugal platform for hydrogel beads-based single-cell phenotypic and molecular analysis." *TechConnect World Innovation*. June 2019, Boston, MA.

[4] Poster. "Development of a low-cost digital nucleic acid amplification test platform using hydrogel beads for environmental surveillance of *Salmonella* Typhi." *11th International Conference on Typhoid and Other Invasive Salmonelloses*. March 2019, Hanoi, Vietnam.

[3] Seminar talk. "3D Microfluidic Solutions for Waterborne Pathogen Analysis." *Caltech Center for Environmental Microbial Interactions (CEMI)* Seminar. September 2018, Pasadena, CA.

[2] Seminar talk. "Microfluidic pathogen detection: live-dead differentiation and digital LAMP." *Caltech ESE seminar: Current Problems in Environmental Science and Engineering*. November 2017, Pasadena, CA.

[1] Poster. "Fate and transport of cerium oxide nanoparticles in aqueous system in presence of redox reactive Mn(II) and As(III)." *Washington University Undergraduate Research Symposium*. August 2014, St. Louis, MO.

Teaching Experience

Teaching assistant, Caltech

- ESE 175: Physical Inorganic Chemistry of Natural Waters 2019.01 - 2019.03
- ESE 176: Physical Organic Chemistry of Natural Waters 2018.03 - 2018.06
- Ge 1: Earth and Environment 2017.03 - 2017.06

Mentorship

- Aya Rosen, Westridge School 2022.07 - Present
- Caris Lee, Westridge School 2020.07 - 2021.04
- Jennifer Zhang, Caltech 2016.06 - 2016.09
- Andrew Dong, Washing University in St. Louis 2014.06 - 2014.08

Other Activities

Postdoc Representative 2022.05 - present
Caltech Women in Geological and Planetary Sciences (WinG) St. Louis, MO
Harpist 2012.01 - 2015.05
Washington University in St. Louis St. Louis, MO
Volunteer 2010.09 - 2013.05
Each One Teach One St. Louis, MO