

Yike Shen, Ph.D.

Postdoctoral Research Scientist

Department of Environmental Health Sciences

Columbia University in the City of New York

630 West 168th Street, Physicians and Surgeons Building, Room 16-416, New York, NY 10032

Email: yike.shen@columbia.edu; shenyike@msu.edu

Tel: +1 (517) 488-9282, Website: <https://yikeshen.github.io/>

Education

Ph.D. Crop and Soil Science – Environmental Toxicology	08/2016 – 05/2020
Ph.D. dual major Environmental Science and Policy	08/2016 – 05/2020
Michigan State University, East Lansing, Michigan, USA	
Dissertation: Antibiotic Resistance and Bacterial Microbiome in Lettuce-Soil Systems	
B.Sc. Environmental and Conservation Sciences	09/2013 – 06/2016
University of Alberta, Edmonton, Alberta, Canada	

Experiences

Postdoctoral Research Scientist	06/2020 – present
Department of Environmental Health Sciences Columbia University in the City of New York Mentor: Andrea A. Baccarelli, MD, Ph.D.	
Graduate Research Assistant	08/2016 – 05/2020
Department of Plant, Soil, and Microbial Sciences Michigan State University Mentor, Advisor: Wei Zhang, Ph.D. Committee members: Drs. Hui Li, Elliot Ryser, Ashley Shade	
Environmental Science and Policy Fellow	09/2016 – 05/2020
Environmental Science and Policy Program Michigan State University	
Student Research Assistant	06/2015 – 02/2016
Department of Renewable Resources University of Alberta Mentor: Scott X. Chang, Ph.D.	

Research Interest

- One health
- Microbiome
- Machine learning
- High dimensional data
- Bioinformatics
- Multi-omics
- Environmental exposures

Publications

Dr. Shen highlighted in **bold**; Corresponding authors marked *

Published

1. Gao F, Zhang W, Baccarelli AA, **Shen Y***. (2022). Predicting Chemical Ecotoxicity by Learning Latent Space Chemical Representations. *Environment International* 163, 107224.
2. **Shen Y***, Laue HE, Shrubsole MJ, Wu H, Bloomquist TR, Larouche A, Zhao K, Gao F, Boivin A, Prada D, Hunting DJ, Gillet V, Takser L, Baccarelli AA. (2022). Associations of childhood and maternal metal exposure with children's gut microbiomes in a Canadian gestation cohort. *Environmental Health Perspectives* 130 (1): 017007.
3. Gao F¹, **Shen Y**¹, Sallach JB, Li H, Zhang W, Li Y*, Liu C*. (2022). Predicting crop root concentration factors of organic contaminants with machine learning models. *Journal of Hazardous Materials* 424,127437. ¹co-first
4. Gao F, **Shen Y**, Sallach JB, Li H, Liu C*, Li Y*. (2021). Direct prediction of bioaccumulation of organic contaminants in plant roots from soils with machine learning models based on molecular structures. *Environmental Science & Technology* 55(24):16358-16368.
5. **Shen Y**, Hamm J, Gao F, Ryser ET, Zhang W*. (2021). Machine learning and statistical models to predict customers' willingness to buy and pay more for labeled products. *Journal of Food Protection* 84.9 (2021): 1560-1566.
6. **Shen Y**, Ryser ET, Li H, Zhang W*. (2021). Bacterial community assembly and antibiotic resistance genes in the lettuce-soil system upon antibiotic exposure. *Science of the Total Environment* 778, 146255.
7. **Shen Y**, Li H, Ryser ET, Zhang W*. (2021). Comparing root concentration factors of antibiotics for lettuce (*Lactuca sativa*) measured in rhizosphere and bulk soils. *Chemosphere* 262, 127677.
8. **Shen Y**, Stedtfeld RD, Guo X, Bhalsod GD, Jeon S, Tiedje JM, Li H, Zhang W*. (2019). Pharmaceutical exposure changed antibiotic resistance genes and bacterial communities in soil-surface- and overhead-irrigated greenhouse lettuce. *Environment International* 131, 105031.

Under review or in revision

9. **Shen Y**, Zhao E, Zhang W*, Baccarelli AA, Gao F*. (202_) Exploring relationships between molecular structures and pesticide dissipation half-lives with machine learning models. *Journal of Hazardous Materials* (Revision decision under review).
10. Campana AM*, Laue HE, **Shen Y**, Shrubsole MJ, Baccarelli AA. (202_). The Gut Microbiota: Assessing the Influences of Environmental Chemicals Exposures on Human Health. *Environmental Pollution* (in revision).

In preparation

11. **Shen Y**, Gao F*, Domingo-Relloso A, Kupsco AJ, Kioumourtzoglou MA, Haack K, Zhang Y, Fretts AM, Umans JG, Tellez-Plaza M, Cole S, Wu H, Baccarelli AA, Navas-Acien A. DeepEWAS assists early intervention of Coronary Heart Disease with machine learning models.
12. Laue HE^{*1}, **Shen Y**¹, Bloomquist TR, Wu H, Brennan, KJM, Raphael C, Serme-Gbedo YK, Abdelouahab N, Bellenger JP, Burris HH, Coull BA, Weisskopf MG, Zhang W, Takser L, Baccarelli AA. Associations of in utero exposure to non-prescription consumer products and childhood gut microbiome, implication for neurodevelopmental effects. ¹co-first

13. **Shen Y**, Kioumourtzoglou MA, Spiro A, Vokonas P, Baccarelli AA, Gao F*. A decade of dedication: Bird-view of Normative Aging Study.
14. **Shen Y***, Bloomquist TR, Kupsco AJ, Rauso A, Gao F, Meyn P, Takser L, Baccarelli AA. Evaluation of bacterial RNA quality and shotgun metatranscriptome sequencing.
15. Chen Z, Zhang W, Peng A, **Shen Y**, Jin X, Stedtfeld RD, Boyd SA, Teppen BJ, Gu C, Zhu D, Luo Y, Li H*. Antibiotic resistance genes and bacterial community assembly in soils exposed to antibiotics at environmentally relevant concentration.
16. Campana AM*, Wu H, **Shen Y**, Laue HE, Bloomquist TR, Posner J, Takser L, Baccarelli AA. Association between the and mid-childhood gut microbiome and neurocognitive outcomes in GESTE, a Canadian cohort Study.

Analysis in progress

.....Coauthors to be add, order may change.

17. **Shen Y**, Kioumourtzoglou MA,Spiro A, Vokonas P, Baccarelli AA, Gao F*. Hypothesis Generation for the Epidemiological Cohort Studies using Deep Learning-Based Network Analysis.
18. **Shen Y***, Laue HE,, Campana AM, Bellenger JP, Takser L, Posner J, Baccarelli AA. Effects of Childhood Flame Retardants on Brain Function and Attentional Deficits in School-age Children – Brain Imaging, Neurobehavioral, and Gut Microbiome Studies in GESTE.
19. **Shen Y**,, Liu S, Busch A, Almansa XF, Norton J, Safferman S, Zhang W*. Impact of biosolids application on agricultural soil microbial community structure and functional potential.
20. Liu S, **Shen Y**, Busch A, Almansa XF, Norton J, Safferman S, Zhang W*. Biosolid application increases nitrogen and phosphorus availability and microbial activities in agricultural soils: a bi-decadal meta-analysis (2000–2020).

Teaching Assistant Experiences

- SHARP Python Boot Camp, Columbia University Summer 2021
- SHARP Epigenetics Boot Camp, Columbia University Summer 2020
- CSS 340: Applied Soil Physics, Michigan State University Spring 2018 and Spring 2019
- CSS 330: Soil Chemistry, Michigan State University Spring 2019
- RenR 299: Environmental and Forestry Spring Field School, University of Alberta Spring 2015

Skills

Computational: R, Python, Linux, Unix, Shell Script, and High-Performance Computing Clusters, Amazon Web Service, GitHub

Data analysis: big data analytics, metagenomics data analysis, machine learning, data visualization

Laboratory: DNA and RNA extraction, PCR, sequencing, gel electrophoresis, molecular biology, bacterial culture, chemical hygiene, laboratory safety, hazardous waste; biosafety principles (level 1 and 2), and lab security awareness

Presentations

Presenter highlighted in **bold**

A. *Voluntary Presentations*

1. **Yike Shen**, Feng Gao, Wei Zhang, Andrea A. Baccarelli. Predicting Chemical Ecotoxicity by Learning Latent Space Chemical Representations. March 20, 2022. American Chemical Society National Meeting Spring 2022. San Diego, CA, March 20-24, 2022 (oral presentation).
2. **Yike Shen**. Harnessing High Dimensional Exposure and Omics Data in Environmental Health Sciences. February 21, 2022. Department of Environmental Health Sciences, Columbia University (seminar talk).
3. **Yike Shen**, Hannah E. Laue, Martha J. Shrubsole, Haotian Wu, Tessa R. Bloomquist, Annie Larouche, Kankan Zhao, Feng Gao, Amélie Boivin, Diddier Prada, Darel J. Hunting, Virginie Gillet, Larissa Takser, Andrea A. Baccarelli. 2021. Association of childhood and maternal metal exposure with children gut microbiome in a Canadian gestation cohort. International Society for Environmental Epidemiology. New York, NY. August 24, 2021 (spotlight oral presentation). (held online due to COVID19)
4. **Yike Shen**, Hannah E. Laue, Martha J. Shrubsole, Haotian Wu, Tessa R. Bloomquist, Annie Larouche, Kankan Zhao, Feng Gao, Amélie Boivin, Diddier Prada, Darel J. Hunting, Virginie Gillet, Larissa Takser, Andrea A. Baccarelli. 2021. Association of childhood and maternal metal exposure with children gut microbiome in a Canadian gestation cohort. American Society of Microbiology Conference – ASM World Microbe Forum, June 21, 2021 (poster presentation). (held online due to COVID19)
5. **Yike Shen**, Elliot T. Ryser, Hui Li, Wei Zhang. 2020. Bacterial Community Assembly and Antibiotic Resistance Genes in the Lettuce-Soil System upon Exposure to Anthropogenic Antibiotics. American Society of Microbiology Conference – ASM Microbe 2020. Chicago, IL, June 18, 2020 (poster presentation). (held online due to COVID19).
6. **Yike Shen**, Elliot T. Ryser, Hui Li, Wei Zhang. 2019. Uptake and Accumulation of Antibiotics and Associated Impact on Bacterial Microbiome and *Salmonella* Survival in Lettuce. ASA - CSSA-SSSA International Annual Meeting. San Antonio, TX, November 12 (oral presentation).
7. **Yike Shen**, Joseph Hamm, Feng Gao, Wei Zhang. 2019. Machine learning and statistical models to predict customers' buy and pay preferences for labeled products. Environmental Science and Policy Research Symposium 2019. East Lansing, MI, Oct 28 (oral presentation).
8. **Yike Shen**, Elliot Ryser, Hui Li, Wei Zhang. 2019. Understanding *Salmonella* Survival and Microbiome Changes in Lettuce Production under Antibiotic Stress. US-China Environment and Sustainability Forum at the University of Michigan. Ann Arbor, MI, October 2 (poster presentation).
9. **Yike Shen**, Elliot T. Ryser, Hui Li, Wei Zhang. 2019. Antibiotic resistance genes, microbiomes and *Salmonella* survival in lettuce exposed to antibiotics via soil surface irrigation. American Chemical Society National Meeting #257. San Diego, CA, August 25-29 (oral presentation).
10. **Yike Shen**, Robert D. Stedtfeld, Xueping Guo, Gemini D. Bhalsod, Sangho Jeon, James M. Tiedje, Hui Li, and Wei Zhang. 2018. Pharmaceutical Exposure Changed Bacterial Community and Antibiotic Resistance Gene Profiles in Surface- and Overhead-Irrigated Greenhouse Lettuce. American Chemical Society National Meeting #256. Boston, MA, August 19-23 (oral presentation).
11. **Yike Shen**, Gemini D. Bhalsod, Xueping Guo, Sangho Jeon, Tiffany Stedtfeld, Robert D. Stedtfeld, James M. Tiedje, Hui Li, and Wei Zhang. 2017. Antibiotic Stress Changed Microbial Community and Distribution of Antibiotic Resistance Genes in Surface and Overhead Irrigated

Greenhouse Lettuce. 4th International Symposium on the Environmental Dimension of Antibiotic Resistance. East Lansing, MI, August 13-17 (poster presentation).

12. **Yike Shen**, Gemini D. Bhalsod, Xueping Guo, Luxi Yang, Sangho Jeon, Robert D. Stedtfeld, James M. Tiedje, Hui Li, and Wei Zhang. 2017. Distribution of antibiotic resistance genes in surface and overhead irrigated greenhouse lettuce. American Society for Microbiology Conference - Innovative Microbial Ecology for Mitigation of Antibiotic Resistance and Bacterial Diseases. Crystal City, VA, March 22-25 (oral presentation).

B. Invited Oral Presentations

1. **Yike Shen**, Feng Gao, Marianthi-Anna Kioumourtzoglou, Andrea A. Baccarelli. Deep Learning based Network Analysis in the Normative Aging Study. December 10, 2021. Invited by Columbia University Data Science and Health Initiative.
2. **Yike Shen**. GESTE Microbiome. Université de Sherbrooke, Quebec, Canada. June 22, 2021. Invited by Dr. Larissa Takser.
3. **Yike Shen**. Assessing Antibiotics, Antibiotic Resistance Genes and Microbiome in Lettuce and Food Safety Related Consumer Preference.
 - a. EMBL, Westlake University, Hangzhou, Zhejiang, China. January 17, 2020. Invited by Dr. Feng Ju.
 - b. Institute of Nuclear-Agricultural Science, Zhejiang University, Hangzhou, Zhejiang, China. January 16, 2020. Invited by Dr. Haiyan Wang.
 - c. College of Environmental Science and Engineering, Nankai University, Tianjin, China. January 14, 2020. Invited by Dr. Zeyou Chen.
 - d. Institute of Plant Protection, Chinese Academy of Agricultural Sciences, Beijing, China. January 13, 2020. Invited by Dr. Yuanbo Li.
 - e. Institute of Soil-Water Resource and Environment, Zhejiang University, Hangzhou, Zhejiang, China. January 6, 2020. Invited by Dr. Bin Ma.
 - f. The International Youth Scholars Forum of Zhejiang A&F University, Zhejiang A&F University, Hangzhou, Zhejiang, China. December 28, 2019. Invited by School of Environmental and Resource Sciences.
4. **Yike Shen** and Wei Zhang. The T concept of research in Environmental Dimension of Antimicrobial Resistance – Perspectives from an interdisciplinary Environmental Scientist in training. Institute of Soil-Water Resource and Environment, Zhejiang University, Hangzhou, Zhejiang, China. December 25, 2017. Invited by Dr. Bin Ma.

Research Grants

- Representation learning in high dimensional epigenomics, metagenomics, and exposomics data in predicting health outcomes; NIEHS R01 – planned

Review Service

- Environmental Science & Technology – #1
- Environmental Research – #1
- Science of the Total Environment – #1
- Food Chemistry – #1
- BMC Genomics – #2

- Environmental Pollution – #2
- Frontiers in Microbiology – #2
- Journal of Environmental Management – #1

Awards

Awards from Michigan State University:

- | | |
|--|-------------|
| • Graduate Research Assistantship | 2016 – 2020 |
| • Institute for Integrative Toxicology Summer Travel Award | 2017 – 2020 |
| • Dissertation Completion Fellowship | 2019 |
| • Graduate School Travel Funds | 2019 |
| • College of Agriculture and Natural Resources Food Systems Fellowship | 2019 |
| • Environmental Science and Policy Program Travel Grant | 2017, 2019 |
| • Environmental Science and Policy Doctoral Recruitment Fellowship | 2016 |

External Awards

- | | |
|--|------------|
| • ASM Travel Grant (American Society for Microbiology) | 2017 |
| • First Class Standing (University of Alberta) | 2015, 2016 |
| • Undergraduate Research Grant (Natural Science and Engineering Research Council of Canada - CREATE Grant) | 2015 |
| • ALES Student Engagement Fund (University of Alberta) | 2015 |
| • ZAFU - UofA (ALES) Award (University of Alberta) | 2013 |
| • National Scholarship of China (Ministry of Education in China) | 2013 |

Languages

- English
- Chinese