Xin Zhang, MPH, MS, COHC

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Summary

PhD candidate in Environmental Health Sciences and Scientific Computing focusing on risk prediction of hearing impairment and non-auditory outcomes (e.g., dementia, sleep disorder) using multimodel data collected from health wearables, with a special interest in high-risk occupation groups. Experience in scalable data pipelines and modeling physiological responses affected by exposures using R and Python.

Education

University of Michigan (U of M) School of Public Health — Ann Arbor, MI, US
PhD in Environmental Health Science and Scientific Computing — Aug 2022 – present
Master of Science (MS) in Biostatistics — Feb 2023 – May 2025
Master of Public Health (MPH) in Industrial Hygiene — Aug 2018 – Apr 2020

- Certified Occupational Hearing Conservationist (COHC)

Peking University, School of Nursing, School of Psychology & Cognitive Science — Beijing, China
Bachelor of Science in Nursing, dual degree in Psychology — Sept 2014 – July 2018

Research Experience

Graduate Student Research Assistant, U of M, Dept. of Env. Health Sci. — Ann Arbor, MI, US
Supervisor: Rick Neitzel, PhD, MS, CIH, FAIHA — Aug 2022 – present

Key Projects: Dose-response relationship of noise exposure and hearing loss measured by consumer wearable sensors; temporal effect of noise exposure on heart rate variability change using real-time health wearable data; app-based hearing test validation on consumer headphones.

- Constructed novel noise metrics using PySpark and SQL on AWS platform, to distinguish the temporal distribution of hazardous noise
- Efficiently curated daily headphone and environmental noise data continuously measured over 5 years from wearables with distributed computation to cut run time
- Examined the causal and temporal relationship of loud sound and psychophysiologic changes using distributed lag models, hierarchical Bayesian models in R with STAN
- Trained personalized dose-response models to predict the psychophysiologic and auditory responses to noise given the effect heterogeneity across individuals
- Administered hearing tests (pure tone audiometry and speech-in-noise) on smartphone app-based hearing tests to promote hearing care through accessible screening tools
- Conducted validation and performance analysis of the app-based hearing tests against clinical gold standard
- Constructed end-to-end data pipeline to process and store participants' hearing test data and automate report generation process with customized hearing tests visualization
- Trained dose-response models, under the machine learning framework, to predict speech recognition difficulties using sound levels recorded

Research Scholar, Johns Hopkins Bloomberg School of Public Health — Baltimore, MD, US
Supervisor: Jennifer Deal, PhD; Nicolas Reed, PhD — June 2024 – July 2024

Key Projects: Evaluating noise exposure and cognitive decline in Atherosclerosis Risk in Communities Neurocognitive Study (ARIC-NCS).

- Examined the role of hearing loss, as an effect modifier, in the causal relationship between noise and dementia (cognitive decline rate) using mixed linear effect models with data from a multi-center longitudinal cohort
- Innovatively used audiogram noise notches to quantify noise exposure history
- Co-first authorship on a hearing conference poster and a manuscript

Research Associate, U of M, Dept. of Env. Health Sci.   Ann Arbor, MI, US
Supervisor: Rick Neitzel, PhD, MS, CIH, FAIHA   Aug 2020 – Aug 2022

Key Projects: Assessment of exposure risks to SARS-CoV-2 in public buildings; exploration of noise exposure and heart rate in E-waste recycling workers; survey design for a nationwide longitudinal cohort study; data enrichment for NoiseJEM.

- Estimated COVID-19 infection risk via bioaerosol inhalation or surface contact using quantitative microbial risk assessment (QMRA)
- Led field bioaerosol and surface sampling during the pandemic, quantified viral concentration using RT-qPCR, conducted data analysis, and presented weekly reports to the study team
- Published first-authored peer-reviewed paper on estimated infection risks though two routes of exposure, which provided timely evidence for safe back-to-school guidelines during the pandemic
- Conducted literature review and time-series analysis to examine the causality between noise exposure and various heart rate metrics for E-waste recycling workers
- Designed systematic occupation surveys in a nationwide longitudinal cohort study to efficiently classify participant's occupation information and to assess perceived occupational noise exposure
- Collected noise exposure data through Freedom of Information Act (FOIA) requests for *NoiseJEM*, a valuable data repository and visual dashboard for noise exposure recordings by occupations.
- Assisted with grant writing for research projects

Professional Experience

Statistical Consultant STATCOM at the University of Michigan   Ann Arbor, MI, US
(STATCOM@UMICH)   Jan 2024 – Oct 2024

- Visualized data on the yearly use of restraints in juvenile justice center for project client, a non-profit organization advocating for equitable youth justice policies and practices.
- Established data repository to store web-scrapped reports for clients and built an information dashboard that automatically updates with new data.

Industrial Hygienist (Facilities & Operation), U of M, Dept. of Environment,   Ann Arbor, MI, US
Health & Safety   Apr 2019 – Apr 2020

- Conducted the Hearing Conservation Program and designed extended noise monitoring study by trades to determine the typical exposure level by occupation; monitored indoor air quality for lead, asbestos, and mold
- Worked as a food safety inspector during NCAA football seasons in the Michigan Stadium
- Managing multiple regulatory datasets or repositories including confined space permits, Safety Data Sheets (SDS), new lockout/tagout (LOTO) program for student machine shop
- Designed occupational health and safety monthly training curricula for employees

Medical Student Intern, Peking University People's Hospital, Department of   Beijing, China
Surgery   July 2017 – May 2018

- Completed clinical practices with a focus on peri-operative nursing coordination, clinical trial coordinator certificate training
- Evaluated work stress, burnout and organizational commitment among operating room nurses

Skills and Technical Training

Programming Languages: R, Python, Spark, STAN, SQL, SAS, SPSS

Formal Training: Supervised/unsupervised ML, classification, regression, clustering, neural networks (via Data Science for Predictive Analysis).

Upcoming: MIDAS AI Summer Academy (2025): Theory and evaluation of ML models; AI integration into scientific workflows.

Awards and Scholarships

- American Auditory Society Mentored Student Research Presentation Travel Award (2025)
- Rackham International Students Fellowship/Chia-Lun Lo Fellowship (2024)
- Undergraduate Research Opportunity Program Outstanding Mentor Award (2024)
- Rackham Graduate Student Research Grants (2023, 2024)
- National Hearing Conservation Association Scholarship Foundation Student Conference Award (2023)
- International Society for Environmental Epidemiology Poster Award (2023)
- The Michigan Industrial Hygiene Merit Society Scholarship (2021)
- The National Science Foundation International Global Scholarship (2018-2020)
- Peking University Student of Merit (2017)

Selected Publications   C=Conference, D=Dissertation, J=Journal, P=In Preparation

[P.1] Zhang, X., Alves, S., Jiang, K., et al. **The association between excessive noise exposure and cognitive decline in Atherosclerosis Risk in Communities Neurocognitive Study (ARIC-NCS)**. *Manuscript in preparation*

[P.2] Tang, Y, **Zhang, X.**, Smith, L.M. et al. **Tinnitus Prevalence, Characteristics in the United States – Insights from Apple Hearing Study**. *Manuscript in preparation*

[D.1] Zhang, X., et al. **The prolonged physiological responses to environmental noise and headphone audio using Bayesian distributed lag model**. *Manuscript in preparation*

[D.2] Zhang, X., et al. **The impact of noise on speech recognition difficulties in the absent of hearing threshold shifts**. *Manuscript in preparation*

[D.3] Zhang, X., et al. **Examine the use of booth-less smartphone-based hearing tests using personal headphones**. *Manuscript in preparation*

[J.1] Zhang, X., Wu, J., Smith, L.M. et al. (2022). **Monitoring SARS-CoV-2 in air and on surfaces and estimating infection risk in buildings and buses on a university campus**. *J Expo Sci Environ Epidemiol*. DOI: 10.1038/s41370-022-00442-9

[J.2] Fan, Y., Fang, M., **Zhang, X.** et al. (2022). **Will the economic growth benefit public health? Health vulnerability, urbanization, and COVID-19 in the USA**. *Ann Reg Sci*. DOI: 10.1007/s00168-021-01103-9

[J.3] Fan, Y., Döring, T., Li, S., **Zhang, X.** et al. (2024). **Energy poverty and public health vulnerability: A multi-country analysis**. *Sustainable Development*, 1–20. DOI: 10.1002/sd.2965

[C.1] Zhang, X., Wu, J., Smith, L.M., et al (2022). **Infection Risk Modeling of SARS-CoV-2 in Air and on Surfaces on a University Campus**. *AIHcexp2022*

[C.2] Neitzel R.L., Shkembi A., Wang L., Smith L.M., **Zhang, X.** (2023). **Update on The Apple Hearing Study**. *NHCA Spectrum*

[C.3] Zhang, X., Shkembi, A., Smith, L.M., & Neitzel, R.L. (2023). **Noise Exposure and Acute Changes to Monitored Heart Rate among Electronic Waste Recycling Workers** . *NHCA Spectrum*

[C.4] Zhang, X., Alves, S., Jiang, K., Myers, C., Reed, N., Deal, J. (2025). **Noise exposure and cognitive decline in ARIC-NCS**. *American Auditory Society Scientific and Technology Meeting*

Service and Leadership

- **Co-Chair,** UM EHS Doctoral Student Peer Mentoring Program (DSPMP) (March 2023-present)
- **Mentor,** Undergraduate Research Opportunity Program (UROP) (September 2023-present)
- **Marketing Core,** National Hearing Conservation Association (NHCA) (February 2023-present)
- **Member,** UM Industrial Hygiene Students Association (UMIHSA) (September 2018-present)
- **Member,** American Industrial Hygiene Association (AIHA) (April 2020-present)
- **Service Chair,** UM Environmental Health Students Association (EHSA) (Aug 2022-May 2023)
- **Chair,** PKU Health Science Center Student Union (January 2017-May 2018)