Tuo Liu

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Linkedin|Github|Website
Tucson, AZ

EDUCATION

University of Arizona — Tucson, AZ
Ph.D. in Environmental Hlth Sci — *Sep 2021 - present*
GPA: 4.00 / 4.00

University of Michigan — Ann Arbor, MI
Master of Science in Environmental Hlth Sci — *Sep 2018 - May 2020*
GPA: 3.80 / 4.00

RESEARCH PROJECTS

Urinary Metabolomics in Tucson Firefighters: differential metabolome by Hispanic ethnicity:
Research Associate, Dept of Community, Environment & Policy, University of Arizona
Advisor: Drs. Jefferey Burgess & Melissa Furlong — *Jun 2022 - Present*
• Aims: Characterizing differential metabolome by Hispanic ethnicity, before and post fire exposure
data source: Fire Fighter Cancer Cohort Study (FFCCS)
• Research question: Is there a difference in the metabolic profiles between Hispanic and Non-Hispanic
firefighters? Is the difference exacerbated by fire exposure?
• Responsibility: data analyst and manuscript composition

A metabolome-wide association study (MWAS) with epigenetic clocks in firefighter
Research Associate, Dept of Community, Environment & Policy, University of Arizona
Advisor: Dr. Jefferey Burgess & Dr. Melissa Furlong — *Jun 2022 - Aug 2022*
• Aims: Associating differential metabolome by fire exposure with epigenetic age in Tucson firefighters
• Research question: Is the change in the metabolic profiles caused by fire exposure associated with epigenetic
age among firefighters?
• Responsibility: data analyst

Metabolomics with Fire Fighters Cancer Cohort Study (FFCCS): urinary metabolic biomarker of prevalent cancers among fire fighters
Research Assistant, Dept of Community, Environment & Policy, University of Arizona
Advisor: Dr. Jefferey Burgess & Dr. Melissa Furlong — *Sep 2021 - Present*
• Built a metabolomics data analysis pipeline: components include data quality assurance pipeline, data acquisition
using LC-MS, annotation confidence indication, statistical data analyses, data visualization
• Presentation & communication: poster presentation at Cancer Center Retreat, manuscript composition
• Coauthored a manuscript titled "Evaluating Changes in Firefighter Urinary Metabolomes After Fires: An
Untargeted, High-Resolution Approach" (under internal review)

Invisible Fishers: intervening anemia among female fish smokers of reproductive age in Ghana
Student Researcher, Dept of Environmental Health Sciences, University of Michigan.
Advisor: Dr. J. Tim Dvonch — *Dec 2018 - Dec 2019*
• Literature review: correlation between $PM_{2.5}$ and CO under various occupational/domestic settings
• Collected and assessed 120 female fish smokers' occupational exposure data to $PM_{2.5}$ and CO
• Assessed the validity of CO being a reliable surrogate of $PM_{2.5}$ using LME model
• Identified determinants of personal exposure under given occupational background
• Analytical tool used: R/Excel

Biomarkers of Air Pollutants Exposure in the Chinese aged 60-69 (China BAPE)
Research Intern, Department of Toxicology, NIEH China CDC
Advisor: Dr. Song Tang — *May 2020 - Aug 2020*

• Literature review: air pollution and metabolic responses; linear mixed effect model
• Data processing: data integration of personal exposure, physical examination, fixed-site ambient monitors, and biomonitoring results of blood and urine samples
• Data analysis & visualization: boxplots, Venn diagram, Heat map, correlation map, OPLS-DA analysis, LME modeling

DATA SCIENCE PROJECTS

Exploring neighborhoods & Chinese restaurants in Toronto
IBM Data Science Professional Certificate Capstone *May 2020*
• Web scrapped Postal code, borough, neighborhood, geographical coordinates of the neighborhoods & demographics of Toronto from Wikipedia
• Used Foursquare API to extract neighborhood information, e.g., restaurants, bars
• Used K-means clustering & Folium map figure out the status quo of Asian & Chinese restaurants and which neighborhood is most suitable for starting a new Chinese restaurant

Arizona Pesticide Use
Oct 2022
• Learnt basics and layout of Shiny package
• Built a R web application built using Shiny and Flexboard package
• Visualized the pesticide usage in the State of Arizona (1992-2016) using mapview & Plotly package in R

Personal Expense Tracker
Dec 2022
• Learnt basics and layout of Streamlit module
• Built a Python web application built using Streamlit module
• Connected to and stored customer data in NoSQL database from deta
• Visualized personal expense with an interactive Sankey chart using Plotly module

SKILLS & AWARDS
• Technical: Professional Certificate of Data Science from IBM, Proficient in Python, R, SQL
• Languages: Native in Mandarin, fluent in English
• Volunteer: Clean Water Volunteer, Huron River Council, Ann Arbor, MI, US
• Interests: Bodybuilding, Fishing, Coding, Data Visualization
• Awards: Academic Performance Scholarship (2013-2015), Outstanding Student Leader (2013-2015), PhD scholarship ($10,000)
• GRE: Verbal 161/170; Quantitative 170/170; Analytical Writing 4.0/6.0