Shangbin Tang

Phone: +1 412-419-5030 Email: shangbin.tang@outlook.com Personal website: https://shangbintang.github.io

*Collaborative research data analyst with a focus on healthcare, geospatial, and population-level data. Experienced in working with interdisciplinary teams to analyze large-scale claims, population, and geospatial data using **SQL**, **Python**, **SAS**, and **ArcGIS**. Skilled in building reproducible analytics workflows and translating complex data into actionable insights that support **public health research**, **resource planning**, and **evidence-based decision-making**.*

EDUCATION

University of Pittsburgh, Kenneth P. Dietrich School of Arts & Sciences — *Pittsburgh, PA*
Master of Science in GIS and Remote Sensing — *Dec 2021*

Chang'an University, School of Earth Science and Resources — *Xi'an, Shanxi, China*
Bachelor of Science in Geographic Information Science — *Jun 2019*

EXPERIENCE

Research Data Analyst

University of California, San Diego
Feb 2022 – Present

Project: Anticoagulant Initiation and Health Outcomes in Atrial Fibrillation During COVID-19
Publications: BMC Cardiovascular Disorders, AHJ Plus: Cardiology Research & Practice, etc.

- Extracted and filtered patient cohorts from **CMS Medicare** and **Optum** claims databases using **SAS** and **SQL**.
- Built **medication diaries** and evaluated clinical outcomes from over 28 million longitudinal claims data.
- Conducted **interrupted time series analyses** to evaluate temporal changes in anticoagulant use and health outcomes.
- Automated acquisition of 4000+ days of weather data for the whole US from **NASA DAYMET** using **Python**.
- Performed spatial correlation analysis to explore links between extreme weather events and patient outcomes.

Project: Geographic Access to Community Pharmacies via Multimodal Transportation

- Conducted spatial accessibility analysis using three travel modes—**driving**, **public transit**, and **walking**—in the 10 largest U.S. metropolitan areas.
- Modeled daily pharmacy visits based on **realistic travel time data** for each mode across diverse urban settings using **routing APIs (Google, Bing)** for multiple travel modes.
- Applied the **enhanced two-step floating catchment area (E2SFCA)** method, combining transportation networks, population distribution, and supply-demand ratios.

Project: National Spatial Accessibility of Pharmacies and Healthcare Facilities
Publications: Journal of the American Pharmacists Association, Health Affairs Scholar, etc.

- Assessed access to 70,000+ pharmacies across the U.S. using **ArcGIS StreetMap Premium**.
- Simulated travel times and distances for over 100 million individuals from **RTI synthetic population** datasets.
- Identified underserved regions by generating service areas and analyzing resource coverage gaps for high-risk populations.

Project: Usability of Price Transparency Data

- Cleaned and standardized **Hospital Price Transparency data**; extracted and structured over 3 million procedure reports submitted by 1,000+ National Provider Identifiers (NPIs).
- **Identified and classified payment units** based on National Drug Codes (NDCs) and Average Sales Prices (ASPs) quantities from raw data to assess consistency and interpretability.

Graduate Student Researcher

University of Pittsburgh
Sep 2020 – Dec 2021

Project: Accessibility of COVID-19 Vaccine Providers Across the U.S.
Publications: PLOS Medicine, BMC Research Notes, etc.

- Aggregated and analyzed data from 70,000+ vaccine provider sites including pharmacies, hospitals, and FQHCs.
- Integrated census and **RTI synthetic population** data to evaluate access disparities across demographic groups.
- Published results in a **white paper** cited by mainstream media (*The Washington Post, NY Times, NPR, CNN(story 1, story 2), FiveThirtyEight, NBC News, etc.*).

Project: Interactive Dashboard for Pharmacies and Medically Underserved Areas (MUAs)

- Developed a web map application with dynamic statistics to support **COVID-19 vaccine allocation** in underserved regions.
- Helped independent pharmacies in Pennsylvania in securing additional vaccine supplies from the state health department.

LANGUAGES

- English
- Chinese (Mandarin, Cantonese)

CERTIFICATIONS

- **IBM Data Science Professional Certificate** (Coursera)
- **Google Cloud Data Analytics Professional Certificate** (Coursera) – In Progress

PUBLICATIONS (Selected)

- *Mathis WS, Kahn PA, **Tang S**, Berenbrok LA, Hernandez I. **Empirically-derived, locally responsive travel time thresholds for optimal geographic supermarket access using national commuting data. Journal of Transport Geography.** 2024;118:103945. doi:10.1016/j.jtrangeo.2024.103945*
- *Mathis WS, Berenbrok LA, Kahn PA, Appolon G, **Tang S**, Hernandez I. **Vulnerability Index Approach to Identify Pharmacy Deserts and Keystone Pharmacies. JAMA Network Open.** 2025;8(3):e250715. doi:10.1001/jamanetworkopen.2025.0715*

These studies extended the concept of "deserts" from food access to healthcare, developing methods to define pharmacy deserts and identify keystone pharmacies—locations whose closure would significantly disrupt local healthcare access.
I geocoded supermarket and grocery store locations from TDLinx and integrated them with U.S. Census Bureau TIGER shapefiles and American Community Survey data. My work supported the spatial modeling of access patterns and the development of localized travel time thresholds for identifying areas with critical vulnerabilities in both food and pharmacy access.

- *Appolon G, **Tang S**, Gabriel N, et al. **Racial and ethnic inequities in spatial access to pharmacies: A geographic information system analysis. Journal of the American Pharmacists Association**. 2024;64(4):102131. doi:10.1016/j.japh.2024.102131*
- *Appolon G, **Tang S**, Gabriel N, et al. **Association Between Redlining and Spatial Access to Pharmacies. JAMA Network Open.** 2023;6(8):e2327315. doi:10.1001/jamanetworkopen.2023.27315*

These two studies expanded on our earlier work in pharmacy accessibility by examining structural and demographic disparities in access. I stratified the 30% RTI synthetic population sample by key characteristics such as gender, household income, urbanicity, and Area Deprivation Index (ADI). I also conducted spatial integration of pharmacy access data with historical redlining maps. This analysis supported the team's statistical analysis to evaluate the inequities in pharmacy access across racial, socioeconomic, and historically marginalized groups.

- *Hernandez I, **Tang S**, Morales J, et al. **Role of independent versus chain pharmacies in providing pharmacy access: a nationwide, individual-level geographic information systems analysis. Health Affairs Scholar.** 2023;1(1):qxad003. doi:10.1093/haschl/qxad003*

I led the spatial analysis for this project, modeling service areas based on driving distances for over 61,000 open-door pharmacies nationwide. I performed spatial overlay analysis to identify populations located within the service areas of independent, franchise, and chain pharmacies. I also conducted demographic comparisons—by age, urbanicity, and race/ethnicity—to quantify which subgroups had optimal or suboptimal access and determine the pharmacy types they were most geographically reliant on.

- *Yang L, **Tang S**, Guo J, et al. **COVID-19 Diagnosis, Oral Anticoagulation, and Stroke Risk in Patients with Atrial Fibrillation. Am J Cardiovasc Drugs.** 2024;24(5):693-702. doi:10.1007/s40256-024-00671-3*
- *Yang L, **Tang S**, He M, et al. **COVID-19 pandemic and initiation of treatment for atrial fibrillation: a nationwide analysis of claims data.** BMC Cardiovasc Disord. 2023;23(1):604. doi:10.1186/s12872-023-03614-z*
- *Yang L, **Tang S**, He M, et al. Abstract P541: **Trends in Initiation of Anticoagulation for Atrial Fibrillation in the Early Months of the COVID-19 Pandemic. Circulation.** 2023;147(Suppl_1):AP541-AP541. doi:10.1161/circ.147.suppl_1.P541*

This study assessed how the COVID-19 pandemic impacted the timely initiation of oral anticoagulants (OAC) among patients newly diagnosed with atrial fibrillation.
I built the patient cohort using Optum claims data, selecting individuals based on insurance enrollment, age, chronic conditions, and other clinical criteria. I calculated the time interval between diagnosis and OAC initiation for all eligible patients, providing the basis for the team's evaluation of treatment delays or disruptions during the early pandemic period. I also conducted longitudinal follow-up analyses and constructed individual-level daily medication and medical event diaries, and performed interrupted time series analysis to assess both clinical outcomes—such as hospitalization, major bleeding, and ischemic stroke—and pharmaceutical outcomes, including switching between warfarin and DOACs, medication adherence, and discontinuation.

- *Berenbrok LA, **Tang S**, Gabriel N, et al. **Access to community pharmacies: A nationwide geographic information systems cross-sectional analysis. Journal of the American Pharmacists Association.** 2022;62(6):1816-1822.e2. doi:10.1016/j.japh.2022.07.003*

This project evaluated accessibility to over 70,000 community pharmacies across the U.S.
I modeled individual travel trips and calculated driving distances from households to their nearest pharmacies for more than 99 million synthetic individuals in the RTI synthetic population dataset, using ArcGIS StreetMap Premium. My responsibilities included managing large-scale geospatial data, developing efficient routing workflows, performing statistical summary analyses, and ensuring the accuracy and reproducibility of travel distance estimates for a nationwide accessibility study.

- *Berenbrok LA, **Tang S,** Coley KC, et al. **Access to Potential COVID-19 Vaccine Administration Facilities: A Geographic Information Systems Analysis.***
- *Huang W, Hernandez I, **Tang S**, et al. **Rural-urban disparities in COVID-19 related mortality across US counties by racial and ethnic composition. Pharmacoepidemiology and Drug Safety.** Published online 2022:463-463.*
- *Hernandez I, Dickson S, **Tang S**, Gabriel N, Berenbrok LA, Guo J. **Disparities in distribution of COVID-19 vaccines across US counties: A geographic information system–based cross-sectional study. PLOS Medicine.** 2022;19(7):e1004069. doi:10.1371/journal.pmed.1004069*

This project was one of the earliest large-scale GIS-based analyses of potential COVID-19 vaccination provider accessibility across the U.S. The findings were published as a white paper.
I organized facility data from multiple sources, geocoded addresses to real-world geographic coordinates, and simulated travel routes from residential locations to nearby vaccination sites. Using ArcGIS network analyst to calculate driving distance from households to their closest potential vaccine providers. Provided essential data for the team to further investigate the association and interaction between the spatial accessibility statistics with other factors.