

Zhuoxinran(Zoe) Li

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EDUCATION

BCIT

Geographic Information Systems Advanced Diploma

Remote

Sep 2025 – May 2025(exp)

University of Toronto, St. George

BA, Major in Human Geography, Minor in Geographic Information Systems

Toronto, ON

Sep 2023 – May 2025

Concordia University

Coursework in Urban Studies (Transferred to the University of Toronto)

Montréal, QC

Jan 2021 – May 2023

SKILLS

GIS & Spatial Analysis: ArcGIS Pro, QGIS, Folium, GeoPandas, OSMnx, Network Analyst

Programming & Web Tools: Python (pandas, NumPy, scikit-learn, Matplotlib), SQL, JavaScript, Mapbox GL JS, Bootstrap, HTML/CSS

Design & Visualization: Adobe Illustrator, Adobe Photoshop, interactive dashboards, choropleths

Languages: English (Fluent), Mandarin (Native), French (Intermediate)

SELECTED PROJECTS

Fast Food Accessibility and Socio-Spatial Inequity Analysis

Mar, 2025

- Analyzed fast food access and income disparities using OD Cost Matrix and quartile-based classification.
- Identified public health inequity hotspots in low-income school catchment areas.
- Suggested zoning interventions and nutrition education targeting food-swamped neighborhoods.

CATF Energy Readiness WebMap – GGR472 UofT Experiential Project

Feb - Mar, 2025

- Co-built a scalable WebMap visualizing composite indices of clean energy readiness across African countries.
- Programmed interactive maps, popup bar charts, geocoder search, and UI filters for policy audiences.
- Designed a modular system to scale insights to 54 countries and support equitable energy investment.

EV Charging Accessibility and Equity Mapping – ECCE App Challenge

Feb, 2025

- Designed an interactive GIS web app using Esri Experience Builder to visualize EV charging accessibility across 585 census tracts in Toronto.
- Created a custom EV Demand Score incorporating apartment density, EV ownership, low-income rates, and proximity to underserved GO stations.
- Visualized demand levels (high, moderate, low) and mapped key indicators (EV ownership, public charger gaps, transit hub access) using Natural Breaks and Quantile classification methods.
- Built interactive filter panels, downloadable datasets, and dynamic data tables to support targeted planning decisions for policymakers, planners, and businesses.

Spatial Analysis of Pedestrian-Motor Vehicle Collisions

Feb - Mar, 2025

- Mapped injury hotspots for children and seniors using ArcGIS Pro's spatial statistics (Moran's I, LISA, Getis-Ord Gi*).
- Identified high-risk transit corridors and senior zones in North York aligned with Vision Zero goals.
- Recommended targeted interventions based on identified high-high clusters and emerging hotspots in transitional neighborhoods.

Mapping Senior Displacement and Accessibility in Hamilton

Nov - Dec, 2024

- Built a ward-level vulnerability score using rent burden, senior renter rate, income level, and housing type.
- Conducted isochrone analysis (400m–800m walking, 5–15 min transit) from population-weighted centroids to key healthcare facilities.
- Found negative correlation ($R^2 = 0.27$) between accessibility and vulnerability, exposing infrastructure gaps for low-income senior renters.
- Proposed ward-level interventions for improved transit, care access, and affordable housing in Hamilton's periphery.

Clustering Urban Mobility Patterns with Python

Apr - May 2024

- Clustered 837 taxi rank locations to uncover spatial mobility patterns using KMeans (silhouette score: 0.64).
- Improved clustering quality by applying DBSCAN to filter out outliers, resulting in 51 clusters with an enhanced silhouette score of 0.92. However, DBSCAN is biased for uniform density within clusters.
- Refined clustering performance with HDBSCAN to address varying cluster densities, yielding 61 clusters with a silhouette score of 0.77.
- Finalized clusters with KNN validation to enhance spatial integrity and support location-based urban planning insights.

EXPERIENCE

Esri Canada GIS Centres of Excellence (ECCE) Student Associate

Oct, 2024 - Oct, 2025 (exp)

- Contributed Esri blog posts sharing GIS applications in urban equity and public infrastructure planning.
- Built an interactive EV charging map using ArcGIS Pro and Experience Builder, identifying underserved Toronto communities.
- Used Story Maps for spatial storytelling, emphasizing planning gaps aligned with TransformTO 2040 goals.

Capstone Project Consultant, Toronto Senior Housing Corporation

Sep, 2024 - Apr, 2025 (exp)

- Co-led the design of a hybrid volunteer model for 80+ senior buildings to enhance inclusion and program sustainability.
- Conducted fieldwork and interviews across five sites to uncover onboarding and communication barriers.
- Proposed multilingual materials, flexible roles, and reward systems to improve long-term volunteer engagement.

Graphic Designer & Certified Travel Consultant, Voyages Mei Mei Inc.

Jan, 2019 - Apr, 2021

- Achieved a 90% approval rating from the company manager and a 95% client satisfaction rate for the quality and impact of trips plans, reflecting consistent high performance and customer contentment.
- Designed posters for Canadian and international trips using Adobe Illustrator and Photoshop for customer outreach.

Art Teaching Assistant, Mont-Royal Academy of Fine Arts

Jan, 2019 - Dec, 2019

- Taught five students aged 6–12 creative self-expression and critical thinking through art.
- Assisted with public art exhibits to enhance student confidence and presentation skills.

PUBLICATIONS

- **A Multi-Grained Symmetric Differential Equation Model for Learning Protein-Ligand Binding Dynamics.** Liu, S., Du, W., Li, Y., **Li, Z.**, Bhethanabotla, V., Rampal, N., Yaghi, O., Borgs, C., Anandkumar, A., Guo, H., & Chayes, J. [[In Submission to Nature Communications](#)]
- **Manifold-Constrained Nucleus-Level Denoising Diffusion Model for Structure-Based Drug Design.** Liu, S., Yan, D., Du, W., Liu, W., **Li, Z.**, Guo, H., Borgs, C., Chayes, J., & Anandkumar, A. [[In Submission to Proceedings of the National Academy of Sciences of the United States of America \(PNAS\)](#)]
- **Identification of Cu-N₂ Sites for Zn-Air Batteries in Harsh Electrolytes: Computer Virtual Screening, Machine Learning, and Practical Application.** Xu, C., Li, K., Liu, S., Xu, J., Sharma, S., Zhang, J., Mao, B., Chen, H., Zhang, H., Xu, H., Luo, B., Zhao, H., **Li, Z.**, Huang, Z., Wang, J., Xi, K., Fu, C., Zhao, Y., Chai, G., He, G., & Parkin, I. [[In Submission to Energy and Environmental Science](#)]
- **A Text-guided Protein Design Framework.** Liu, S., Li, Y., **Li, Z.**, Gitter, A., Zhu, Y., Lu, J., Xu, Z., Nie, W., Ramanathan, A., Xiao, C., Tang, J., & Anandkumar, A. [[Nature Machine Intelligence 2024](#)]
- **Unsupervised Discovery of Steerable Factors When Graph Deep Generative Models Are Entangled.** Liu, S., Wang, C., Lu, J., Nie, W., Wang, H., **Li, Z.**, Zhou, B., & Tang, J. [[Transactions on Machine Learning Research 2024](#)]
- **Symmetry-Informed Geometric Representation for Molecules, Proteins, and Crystalline Materials.** Liu, S., Du, W., Li, Y., **Li, Z.**, Zheng, Z., Duan, C., Ma, Z., Yaghi, O., Anandkumar, A., Borgs, C., Chayes, J., Guo, H., & Tang, J. [[NeurIPS 2023](#)]