Freya Tan

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Freya Tan is a quantitative researcher with a focus on complex systems and networks, particularly within urban and transportation systems. Her work is driven by a deep commitment to urban resilience and social equity, targeting support for disadvantaged communities. By effectively merging urban planning with spatial analytics and mobility research, her approach encapsulates a synergistic blend of **"Urban + Tech"** and **"Engineering + Design"**, indicating a progressive approach dedicated to the pursuit of systemic improvements.

Education

Massachusetts Institute of Technology, Cambridge, USA
Master of City Planning (2024-2026)

University of California, Berkeley, USA
Master of Urban Design (2022-2024) GPA: 3.85
Graduate Certificate in Applied Data Science
Graduate Certificate in Geographic Information Science and Technology
Meta Full-Stack Engineer Certificate
Google UI/UX Design Specialization Certificate

Urban: *CE C263H Human Mobility and Network Science (NetworkX, PCA, sklearn, skmob, Geotime), CE 170 Infrastructure Sensing and Modeling (satellite, lidar 3D modeling, Seismic analysis, traffic simulation, OSMNX, geopandas, cenpy)*

Tech: *DATA 200: Principles and Techniques of Data Science (pandas, NumPy, sklearn, SQL, Matplotlib, PCA, kmeans), CS 61A The Structure and Interpretation of Computer Programs (python, scheme, SQL, tree)*

Skills

Languages & Tools: Python, JavaScript, R, SQL, STATA, LATEX, Git, ArcGIS/QGIS, Mapbox, Gephi, Adobe Suite
Statistical Modeling & Data Science: Machine Learning (PyTorch, Tensorflow, sklearn), Time Series Analysis, Regression Analysis, Behavior Modeling, Transportation Simulation, Social Network Analysis, Spatial Analysis
Research: Survey Design & Analysis, Contextual Inquiry, Hypothesis Testing, Scenario Planning, A/B Testing
Design: Data Analysis & Visualization (UI/UX, D3.js, Figma), Web Design and Develop (Front-End & Back-End)
Spoken Languages: Chinese (Native), English (Professional), Cantonese (Intermediate), Japanese (Intermediate)

Publication

2023, Tan, F., Yu, M., Gogri, Y., "Chapter 4: Reimagining Education, Rewinding Valley: A New Knowledge-Production Vision for Salinas Valley," in Ettore Santi (Auth.), Margaret Crawford (ed.), Designing the Rural. Urban Design in Rural California, UC Berkeley

Academic Experience

HuMNet Lab & eCAL Lab, UC Berkeley **Berkeley, CA**
RED-EV: Readiness of Electric infrastructure in Disadvantaged communities for Electric Vehicle charging
Quantitative Researcher (Feb 2023 - Present)

- Developed quantitative models to estimate home and workplace electric vehicle (EV) charging patterns in the Bay Area, integrating demographic factors to enhance the precision of predictions.
- Refined EV charging infrastructure accessibility metrics, balancing supply (existing station locations, availability hours, and pricing) and demand(required hours, energy demand, user behavior, and travel patterns) factors.
- Utilized the TimeGeo Model to strategically identify areas in need of additional EV infrastructure, prioritizing enhancements in accessibility for disadvantaged community and multi-unit dwellings.

DCRP, UC Berkeley **Berkeley, CA**
Climate Equity for Residents of California's Mobile Home Parks, sponsored by Hellman Fellows Fund
Quantitative Researcher (Jun 2023 - Present)

- Led a detailed analysis of a vast dataset encompassing over 5,000 mobile home parks, establishing a structural network to analyze existing patterns, contributing to a deeper understanding of spatial and social dynamics.
- Employed the Secretary of State dataset to meticulously track ownership transitions across 20,000 instances, contributing to the classification and understanding of Mobile Home Park ownership patterns.
- Conducted advanced simulations to assess the impact of climate change factors, such as temperature variations

Soga Research Group, Systems Engineering Department, UC Berkeley **Berkeley, CA**
Berkeley wildfire evacuation Simulation, collaboration with the City of Berkeley
Graduate Student Researcher (Sep 2023 - Present)
- Conducted wildfire behavior simulations under various conditions, including day/night and wind patterns.
- Ran wildfire evacuation traffic simulations in Berkeley accounting for high-risk scenarios and time variations.
- Improved accuracy by incorporating driver behavior, contraflow operations, and rerouting in evacuation models.

Data Science Discovery Program, CDSS, UC Berkeley **Berkeley, CA**
The Bay Twin: A Climate Justice "Digital Twin" for the San Francisco Bay Area
Quantitative Researcher (Sep 2023 - Present)
- Designing visualizations integrating live data streams, static maps, and dynamic models to democratize access to
- urban complex dynamics, such as human mobility, infrastructure , and environmental elements (air and water).
- Built mobile platforms for policymakers in correlating data for informed decision-making and engaging the public

Institute of Urban & Regional Development (IURD), UC Berkeley
Community Engagement Project: Re-designing the Salinas River Corridor **Salinas, CA**
Urban Design Researcher (Sep 2022 - Present)
- Engaged in the Lau Grants-funded interdisciplinary project on Salinas Valley, harmonizing landscape architecture, environmental planning, urban design with the region's social and cultural narratives.
- Facilitated robust collaborations with community stakeholders, ensuring the project's alignment with local interests and fostering inclusive community engagement.

Urban Informality Union (UIU), Hunan University **Changsha, China**
Research Assistant (Oct 2020 - Jun 2021)
- Investigated the development of Dongguashan (5 ha.) commercial street and the relationship with the advancement of Internet technology from 2007 to 2021 using economics theory, to rebuilt the social and economic networks of 20 merchants and 50 residents, and redistribute economic development opportunities.
- Conducted a comprehensive infrastructure analysis for 5 underserved communities, focus on the quality and quantity of infrastructures through GIS and data analysis, to offering a detailed perspective on urban health.

Teaching Experience

UC Berkeley Girls in Engineering **Berkeley, CA**
Program Assistant (2023Jun - Aug 2023)
- Orchestrated and enhanced the Girls in Engineering workshops, covering five distinct engineering disciplines, including Environmental Engineering and Civil Engineering, aligning with contemporary educational methods.
- Developed comprehensive, interactive educational materials, incorporating hand-drawn elements across a 12-page framework to facilitate an immersive learning experience.
- Provided mentorship and direction across three workshop sessions, fostering a supportive environment for a diverse group of participants and promoting STEM engagement.

Urban Informality Union (UIU), Hunan University **Changsha, China**
Teaching Assistant (Oct 2020 - Jun 2021)
- Served as a TA for "Urban Design Studio" and "Transportation Planning," engaging with over fifty students.
- Provided tutoring to foster their development in urban strategies and design interventions.

Professional Experience

CIVIS Design & Advisory LLC **Cambridge, MA & Changsha, China**
Urban Consulting and Design Intern, Team of 6 Researche (Aug 2020 - Oct 2020)
- Conducted a comparative analysis of 12 case studies on the economics of small-scale shops globally, focusing on their size, user demographics, and management.
- Engaged with 12 government officials and collaborated closely with a team of six engineers on transportation design, ensuring the integration of a 500-meter road development with urban commerce needs.
- Compiled a 28-page advisory report on the street vendor economy, proposing a design strategy with a flexible layout to accommodate fluctuating visitor traffic volumes, developed by a quintet of urban designers.

Awards and Scholarship

- Avalon Scholarship of Urban Studies and Planning, MIT 2024-2026
- WUPEN City 2020 International Competition of Urban Design, China | Nomination Award 2020
- **National Scholarship (ranked top 1%, highest scholarship from Ministry of Education of China)** 2019