Brooke Bao

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EDUCATION

Wellesley College, Wellesley, MA   **Expected May 2026**
Candidate for Bachelor of Arts in Data Science, Minor in Economics   GPA: 3.78
 Massachusetts Institute of Technology (MIT), Cambridge, MA   **January 2023 – Present**
 Cross-Registered Student

Relevant Coursework
- Applied Data Analysis, Statistical Inference, Regression Analysis and Statistical Models, Probability, Linear Algebra, Data and Text Mining for the Web, Data Structures, Differential Equations, Econometrics, Research Methods for Ethics of Technology

PROJECTS

Statistical Modeling of Traffic Stops | *Project Contributor* | *Wellesley, MA*   **Nov. 2024 – Dec. 2024**
- Processed and integrated 3M+ Nashville, Tennessee traffic stop records with demographic, employment, and income datasets (40+ variables) using R (tidyverse, ggplot, partykit, randomForest) for data cleaning, NA handling and visualization
- Built predictive models (random forest, conditional inference trees) to identify key factors influencing traffic stops, revealing income and demographics as primary predictors; visualized through statistical tests and various plots

TikTok Recommendation System Analysis | *Project Contributor* | *Wellesley, MA*   **Jan. 2024 – May 2024**
- Analyzed TikTok's recommendation algorithm by collecting and cleaning data on 10,000+ TikTok videos using Python, Pandas, NumPy, and Selenium; statistical analysis of correlations between TikTok's recommendation algorithm and user interactions
- Applied Latent Dirichlet Allocation (LDA) topic modeling using sklearn and performed time series analysis on TikTok ads and For You Page videos to demonstrate correlations between ad topics, seasonal events, and user interests; visualized using Matplotlib

Econometrics Term Paper | *ECON 203, Econometrics* | *Wellesley, MA*   **Sep. 2023 – Dec. 2023**
- Employed causal inference methods (fixed effects and event study) to assess economic impact of euro adoption on FDI, using STATA software to answer the question: "What is the effect of the euro currency on foreign direct investment and remittances?"

RESEARCH EXPERIENCE

MIT Climate & Sustainability Consortium | *Research Assistant, Data Science* | *Cambridge, MA*   **Jun. 2024 – Present**
- Developed data-driven dashboard integrating regional energy datasets for ten consortium corporate partners
- Built interactive JavaScript-based visualizations integrated into a web platform using HTML/CSS to analyze 1M+ rows of U.S. energy consumption records, enabling policy decisions based on time-of-day and seasonal trends

MIT Hatsopoulos Microfluids Laboratory (HML) | *Research Assistant* | *Cambridge, MA*   **Feb. 2024 – Present**
- Conducted inventory analysis and performed Life Cycle Assessments (LCA) and Cost-Benefit Analyses (CBA) to evaluate the environmental and economic impacts of a novel hydrogen production process; paper currently under review for publication

MIT D-Lab | *Research Assistant* | *Cambridge, MA*   **Feb. 2024 – Jun. 2024**
- Collaborated with partner company Greenfoot Africa to identify development needs for their electric bike fleet in Arusha, Tanzania, improving transport in areas with limited vehicle access
- Implemented IoT-based GPS tracking and battery management, enabling real-time data collection to optimize performance

LEADERSHIP EXPERIENCE

Class Council | *Treasurer* | *Wellesley College, MA*   **Apr. 2023 – May 2024**
- Managed $8,000 budget and logistics for events, utilizing organization and project coordination skills

PBHA Chinatown BigSib Mentorship Program | *Co-Director* | *Boston, MA*   **Sep. 2022 – Present**
- Lead a mentorship program linking Wellesley and Harvard students with Chinatown's underserved youth, facilitating over 20 families' engagement through educational and bonding activities; coordinate logistics for bi-weekly group events

SKILLS

- **Programming & Data Analysis:** R (ggplot, tidyverse), Python (Pandas, Matplotlib, sklearn), SQL, STATA, MATLAB, Java
- **Software & Tools:** Microsoft Office (Excel, PowerPoint), Git, VS Code, Jupyter Notebooks, Google Suite, Fusion 360
- **Statistical Modeling**: Regression, Bayesian, Machine Learning, Inference