

NICOLE (YITONG) LIU

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EDUCATION

- Brown University** Aug. 2022 – Exp. May 2027
Ph.D. in Sociology GPA: 4.0/4.0
- Relevant coursework: Causal Inference, Text Analysis, Network Analysis, Hierarchical Data
- M.S. in Data Science** GPA: 4.0/4.0
- Selected and fully funded by Brown's Open Education Initiative to pursue alongside the Ph.D.
 - Relevant coursework: Machine Learning, Deep Learning, Data Engineering, Computer Vision
- Boston College** Aug. 2018 – Dec. 2021
B.A. in Sociology (Honors) GPA: 3.8/4.0

PHD RESEARCH PROJECTS

- Understanding AI Bias via Experimental and Computational Methods** Oct. 2025 – Ongoing
- Dissertation project examining how social and organizational processes in data production shape downstream algorithmic bias.
 - Chapter One: Designs an online experiment that randomly assigns image batches with varying racial, gender, and religious compositions to data annotators, enabling causal identification of relationships between worker demographics and data bias. Images are computationally edited to ensure high realism and precise experimental control.
 - Chapter Two: Uses experimental outputs to formalize annotator judgments as preference and reward signals in reinforcement learning pipelines for vision models, tracing how bias introduced during data production propagates through model optimization to downstream behavior.
- Measuring LLM Reasoning Using Large-Scale Social Survey Data** Dec. 2024 – Ongoing
- First-authored a study that generates and analyzes reasoning traces from mainstream LLMs (e.g., ChatGPT API, Gemini API) using large-scale social survey data.
 - Integrated chain-of-thought outputs with embedding-based analyses (e.g., TF-IDF features and embedding centroids) to develop a scalable framework for characterizing LLM reasoning patterns and directional bias.
 - Manuscript in preparation for submission.
- Computational Text Analysis of Climate Change Discourse on Twitter** June 2023 – Jan. 2024
- Advanced from research assistant to first author, analyzed over 1.2 million tweets using web scraping, data cleaning, topic modeling, and sentiment analysis to examine debates over science and expertise.
 - Leveraged platform-specific structures (e.g., replies and retweets) to characterize engagement dynamics.
 - Manuscript submitted and under review.

WORK EXPERIENCE

- Data Scientist Intern at Supio** June 2025 – Aug. 2025
- Project 1: Designed an LLM-based narrative generation and analysis pipeline, leveraging entity extraction and multi-agent reasoning to enhance relationship mapping in medical case data.
 - Project 2: Built an interactive Streamlit dashboard to visualize and measure product quality, integrating real-time metrics and custom filters to deliver actionable insights for operations teams.

- Performed end-to-end pipeline validation using Python and SQL for both projects, including AWS-based data loading, AI and human evaluation, ensuring robust and production-ready performance across diverse datasets.

Research Intern at Lifespan

Jan. 2025 – Apr. 2025

- Conducted research in 3D computer vision for medical imaging, developing deep learning pipelines for MRI-based glioblastoma prognosis and analysis.
- Implemented and finetuned 3D U-Net and 3D TransNet architectures for multi-modal brain tumor segmentation across full MRI volumes.

SELECTED FELLOWSHIPS AND AWARDS

Open Graduate Education Fellowship

- This competitive fellowship is funded by Brown University to support students pursuing a secondary master's along their Ph.D. degree.

Watson Institute Pre-dissertation Award

- This award funds pre-dissertation fieldwork research in the global south. Amount received: \$5000 (maximum).

Population Studies and Training Center Summer Award

- This award funds summer research related to population research. Amount received: \$1500.