Bernard Shen

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EDUCATION

The University of Chicago Chicago, IL
Bachelor of Science in Computer Science (Specialization in Machine Learning) Expected June 2026
Bachelor of Arts in Economics (Specialization in Data Science)
Cumulative GPA: 3.82

- **Senior Thesis:** "Toward Automated Hiring: Comparing AI and Human Predictions of Worker Retention"
- **Computational Systems:** Operating Systems (A), Database Systems (A), Systems Programming I & II (A/A)
- **Quantitative Economics:** Econometrics (A), Financial Econometrics (A-), Machine Learning (A)
- **Mathematics:** Linear Algebra (A), Calculus I-III (A/A/A), Discrete Mathematics (A-)

RESEARCH EXPERIENCE

University of Chicago Booth Business School Chicago, IL
Research Assistant (Advisor: Dr. Brian Jabrian) May 2025 – Present

- **Senior Thesis (Toward Automated Hiring):** Designing a three-way forecasting contest comparing human recruiters, traditional ML, and fine-tuned LLaMA-2 models. Implementing a "horserace" design on a held-out test set to isolate the marginal predictive value of unstructured text data over structured resume features.
- **Field Experiment (Voice AI):** Developed feature framework for a large-scale RCT (N=70,000) investigating algorithmic labor substitution (study found AI-led interviews increased job offers by 12% and retention by 17%). Proposed hierarchical frameworks to analyze mediating factors in labor outcomes.
- **Literature Review (Choice as Signal):** Synthesized information design and multi-dimensional signaling literature to ground the project's theoretical framework, identifying applicant choice as a novel mechanism that resolves the trade-off between algorithmic efficiency and worker welfare.
- **Unsupervised Learning:** Engineered a modular NLP pipeline using SBERT and HDBSCAN to quantify interview dynamics and topic progression. Developed a high-dimensional feature extraction framework to analyze linguistic patterns and interviewer adaptability across a large-scale corpus of recruitment transcripts.

Global Poverty Research Lab at Northwestern University Evanston, IL
Research Assistant July 2024 – December 2024

- Collaborated on a structured meta-analysis database for the World Bank, standardizing effect sizes and standard errors from heterogenous development economics papers.
- Enforced strict data integrity protocols to validate statistical significance claims across studies, creating the foundational dataset for a global evidence library.

INDUSTRY ROLES

Red Ventures Fort Mill, SC
Data Analyst Intern June 2025 – August 2025

- Engineered a modular SQL pipeline in Databricks to parse 1,500+ product bundles and apply time-versioned rate cards via temporal joins, creating the first centralized variable-cost model for a $21M revenue channel.
- Architected a Python reconciliation script to validate pipeline outputs against raw SFTP activation data, identifying and resolving systematic mispayments (0.4% error rate) by matching order identifiers across systems.
- Led user acceptance testing (UAT) with finance stakeholders to validate edge-case logic, establishing the pipeline as the authoritative source for commission payouts and activation-adjusted revenue forecasting.
- Automated reporting workflows by replacing manual Excel tasks with queryable tables feeding Tableau dashboards, eliminating 12 analyst-hours per month and ensuring data reproducibility.

Those Coffee People Medellin, Colombia (Remote)
Market Research Analyst Intern June 2023 – August 2023

- Led U.S. coffee market research and sizing for cafés and roasters, sourcing and synthesizing data into Excel visualizations that informed go-to-market strategy, driving 194% contract growth and a 107% revenue increase.

COMPUTATIONAL ENGINEERING

Pintos OS | C November 2025

- Architected a virtual memory subsystem using hash-based supplemental page tables to enable lazy loading and demand paging; implemented a bitmap-backed swap partition to support execution under memory constraints.
- Extended the x86 kernel file system with multi-level indexed inodes (direct, indirect, doubly-indirect blocks) to support 8.5MB extensible files and hierarchical subdirectories.
- Engineered a priority scheduler with nested priority donation (depth 8) to resolve inversion deadlocks; optimized timer interrupts using a min-heap data structure for O(1) thread wakeups.
- Implemented system call handlers for process control (exec/wait) with dual-layer memory validation (bounds checking + MMU fault handling) and safe x86 stack argument passing.

MiniDB Storage Management System | Rust May 2025

- Architected a relational database engine with slotted-page storage and heap file management, achieving 475µs for 1,000-record insertions in benchmarks.
- Built Volcano-style query execution engine supporting nested loop joins, hash equi-joins (O(N+M)), and group-by aggregations for end-to-end SQL query processing.
- Engineered a concurrent buffer pool with RwLock latches and automatic page compaction for space reclamation.

LZW Data Compression System | C November 2024

- Engineered a high-performance compression system achieving 38% file size reduction via dynamic code length adjustment (9-20 bits) and dynamic bit-packing strategies.
- Optimized processing throughput using chained hash tables for O(1) code lookups, significantly reducing decoding time for large datasets.
- Processed and reconstructed 10MB text files in 4.6s with zero memory leaks verified by Valgrind, ensuring memory safety in a manual management environment.

TECHNICAL SKILLS

Languages: C/C++, Rust, Python, R, SQL
Data Science: Pandas, Scikit-Learn, NumPy, ggplot2
Research Methods: Causal Inference, Econometrics, Natural Language Processing (NLP)
Tools & Cloud: Git/Github, Valgrind, Unix/Linux, GCP (Vertex AI, GCS), Tableau

LANGUAGES

English (Native), Mandarin (Advanced Conversational), Spanish (Intermediate)

REFERENCES

Dr. Brian Jabrian
Principal Researcher, Roman Family Center for Decision Research
University of Chicago Booth School of Business
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(Relationship: Senior Thesis Advisor)

Dr. Gina Pieters
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(Relationship: Economics Professor)

Dr. Pamela Nogales
Collegiate Assistant Professor of History
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