CHARLES BENELLO

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EDUCATION

UNIVERSITY OF CHICAGO Expected June 2025
Bachelor of Science in **Mathematics** and **Computer Science** (Double Major, **GPA: 3.8/4.0**) *Chicago, IL*

- **Coursework**: Mathematical Foundation of Machine Learning, (Honors) Introduction to Complexity Theory, (Honors) Discrete Mathematics, Abstract Linear Algebra, Accelerated Analysis, Mathematics of Quantum Computing

EXPERIENCE

CHI DATA RESEARCH LAB, UNIVERSITY OF CHICAGO April 2023 – Present
Database Researcher *Chicago, IL*

- Researching on **Intermittent Query Processing**, handling queries without all data available. Implemented a solution to an issue of importing files larger than 500MB, using a Rust CSV crate (library), which entailed **removal of file size limit and increased import speed by 50%**. Currently implementing parallelization for **further improvement to 300%**.
- Implemented a mechanism to **enable file transfers on more controlled chunk sizes** as a solution to a problem of transferring large amounts of data (SELECT ALL) from a large table in the server. **Increased query speed by 200%**.

TSM (Team SoloMid, a leading professional Esports organization**)** July 2023 – September 2023
Business Analyst Intern *Los Angeles, CA*

- Led and advised on the market entry strategy as the only member with expertise in Counter-Strike (CS) 1 and 2, conducting extensive market research and product analysis. Presented predictions on CS 2 and opportunities for TSM to executives.
- Analyzed a competitor map product from 100Thieves and its pricing for an expansion opportunity to Metaverse within Fortnite or Roblox. Called 40 companies for detailed intelligence on the 3rd party rates to build a digital map. **Gained insights on the industry, customer needs, competition, pricing, profitability, service and platform strategy.**
- Led development of three CS 2 videos, writing storyboards, which **resulted in 130K views (vs. usual 20K views)** in the TSM YouTube channel with 2.3 million subscribers.

DIRECTED READING PROGRAM, UNIVERSITY OF CHICAGO April 2023 – June 2023
Undergraduate Researcher, Complexity Theory *Chicago, IL*

- Conducted 10-hour readings weekly on deterministic primality testing, understood the AKS algorithm (identifying primes in polynomial time) from a graduate textbook, and presented to professors, graduate & undergraduate students.

UNIVERSITY OF CHICAGO September 2022 – December 2023
Teaching Assistant, Math 13100, Math 15910, Computer Science 14300 *Chicago, IL*

- Led tutorials for 10 students, creating practice problems and leading discussions. **Received highest avg score** among 15 groups.
- Graded complex math papers weekly for 60^+ and 80^+ students, providing individualized feedback, managing two part-time jobs.

PROJECTS

CRUSTY DB (my own database designed and developed from scratch using Rust, MySQL, databases theories)

- Implemented and optimized database features. Implemented MemStore file manager, upgraded it to a heap file manager and used serialization/deserialization for efficient storage and access as well as faster transfer speed. Resulted in being selected to research in Chi Data Research Lab with Prof. Aaron Elmore.

TUBE CHALLENGE (using Python, Matplotlib, Algorithms, Google/Bing Maps API, Transport for London API)

- Developed an algorithm to find the lowest possible elapsed time to visit all stops across the full London subway ecosystem. **Obtained a better result (13 hrs 40 mins) than the current record (14 hrs 17 mins) by 37 mins**.
- Gathered various data using APIs and customized dataset for London. Devised an algorithm to run between stations overground, allowing users to input the speed using basic measure theory to give a probability window. Developed a new algorithm to produce a deterministic output after extensive research and interviews for months.
- Produced a 90-page document detailing the process. **Became a standard for this project, receiving highest rating**.

PONGATION (a game-like program to find out how ping pong balls leave a maze using Python, Pygame, and algorithms)

- Dynamically generated random mazes, shot balls with different angles using physics simulations, and determined which ones escaped. Tracked the route and recorded the fastest time.

ADDITIONAL INFORMATION

- **Tech skills**: Python, Java, Rust, C/C++/C#, Swift, R, HTML, CSS, Latex, Racket, Linux
- **Familiar topics**: Artificial Intelligence/Machine Learning, Neural Networks, Natural Language Processing, API, Database Normalization, Optimization, Encryption, Decryption, NP V P, Graph Traversal
- **Interests**: Korean (TOPIK level 5/7), Running (Chicago Marathon '22, '23)