# CHARLES BENELLO

(312) 989-9950 cmbenello@uchicago.edu LinkedIn GitHub

## 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 **query optimization** in databases. - Implemented a solution to an issue of importing files larger than 500MB using a Rust CSV crate (library), which entailed the removal of the file size limit and increased import speed by 50%.
- Implemented a mechanism to **allow file transfers in 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 go-to-market strategy as the only member with expertise in Counter-Strike (CS) 1 and 2, conducting extensive market research and product analysis. **Presented CS2 predictions and TSM opportunities to top executives**.
- Analyzed a competitor map product from 100Thieves and its pricing for an expansion opportunity into Metaverse within Fortnite or Roblox. Called 40 companies to get detailed information on the 3rd party pricing to build a digital map. **Gained insights into the industry, customer needs, competition, pricing, profitability, service and platform strategy.**
- Led the development of three CS 2 videos, writing storyboards that **resulted in getting 8 times the usual view counts (164K vs. usual 20K views)** on TSM's YouTube channel which has 2.3 million subscribers.

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

- Conducted 10 hours of weekly reading on deterministic primality testing, understanding 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 23500, Computer Science 14300* *Chicago, IL*

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

## PROJECTS

**CRUSTY DB** (**my own database designed and developed from scratch,** used 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. **Was selected for research in the Chi Data Research Lab with Professor Aaron Elmore.**

**TUBE CHALLENGE** (used 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 in the entire London subway ecosystem. **Achieved a better result (13 hours 40 minutes) than the current record (14 hours 17 minutes) by 37 minutes**.
- Gathered various data using APIs and customized dataset for London. Developed an algorithm to run between stations above ground, 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 months of extensive research and interviews.
- Wrote a 90-page document detailing the process. **Became the standard for this project and received the highest rating**.

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

- Dynamically generated random mazes, shot balls at different angles using physics simulations, and determined which balls 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)