# ROBERTO BRERA

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## EDUCATION

**Columbia University** — New York, NY
*MS in Computer Science,* GPA: 3.7/4.0 — Expected Dec 2025

**Dartmouth College** — Hanover, NH
*BA in Mathematics, Honors Thesis in Computer Science,* GPA: 3.7/4.0 — Jun 2024

## PROFESSIONAL EXPERIENCE

**Morgan Stanley** — New York, NY
*Quantitative Strategist* — Jun 2025 - Aug 2025

- Engineered lock-partitioned hash table for memory allocation tracking with bucket-specific mutexing and futex-backed wakeups; cache-aligned buckets and *O(1)* inserts/removes enabled low-contention multithreaded performance
- Implemented async-signal-safe runtime profiling module overriding *malloc/free/new/delete* and walking stack; sustained ≤2x runtime vs. baseline, surfacing timestamped, per-function allocation/free visibility in arbitrary target
- Developed standalone post-processor for symbolication using *llvm-addr2line* and *readelf*; integrated with Python frontend for interactive dump parsing and visualization; achieved drastically faster profiling than existing tools

**Helikon Investments Limited** — London, UK
*Hedge Fund Analyst* — Jul 2024 - Aug 2024

- Analyzed twelve emerging South American transport and agro-industrial players by synthesizing equity reports and conducting ad-hoc financial modeling; led data-backed strategy for entering $115M long trade, yielding $17M profit
- Designed, implemented, and managed specialized screening system to filter companies by filing metadata, content, and Yahoo Finance live data; scraped SEC EDGAR 10,000+ ticker database in under 2 hours, handling rate limits
- Utilized robotics and physics expertise to conduct targeted research on eight LiDAR and Li-ion battery producers pinpointed by custom-built screening system; spearheaded short-selling strategy on $2.4B market cap company

## PROJECT EXPERIENCE

*Algorithmic Trading leveraging Medium-Term Signals* — Jun 2023 - Aug 2023

- Prototyped standalone program to detect price-RSI divergences from raw price data across arbitrary timeframes, combining with bespoke ladder indicator and adjustable Bollinger Bands to generate four types of trading signals
- Leveraged Interactive Brokers TWS C++ and REST Python API to develop a lightweight portfolio management system and seamlessly integrated it with signal-generating algorithm to execute trading strategies in real-time
- Streamlined sequential data retrieval, trade generation, and performance evaluation in an intuitive backtesting tool, using JSON for data transfer; iteratively polished strategies towards average 18% YoY return for DAX, ESTX, N225

*Search Engine in Assembly (Independent Project)* — Jun 2023 - Jul 2023

- Compiled manually to ARM64 set, counters, linked list, and hash table data structures, outperforming Clang O3
- Crafted standalone query engine in ARM64; linked with crawler, indexer, and web-fetching C programs to deliver comprehensive search engine functionality; sanitized memory safety with valgrind and gdb tools

*Satisficing Secretary Problem (Class Project Expanded to Publication)* — Sep 2022 - Feb 2023

- Devised novel adaptive search strategy selecting amongst top d candidates within an arbitrary pool of n, guaranteeing 21% minimal success probability boost, from 37% in traditional d=1 case to 58% by setting d=2
- Probed (n, d) solution space with a simulated annealing algorithm in Wolfram Mathematica; derived closed-form solution, validated through 100,000 randomized trials in Python with probability discrepancies under .001

## ACTIVITIES

- Competed professionally in FIS alpine skiing circuit for three years, achieving a ranking of 61 GS and 74 SL points
- Showcased musical talent for twelve years as a trumpet player; performed in both traditional and Jazz orchestras; earned Trinity College Grade 8 with Merit and ÖBV Bronze and Silver certificates
- Spearheaded four-student team in Dartmouth Fifty challenge, hiking 54 miles on the Appalachian trail non-stop in 32 hours as only independent group, strategically allocating resources along route

## SKILLS

**Languages**: Italian, Japanese, German
**Computer**: C/C++, Python, ARM64, Unix, Linux, M365, Bitcoin Core, Geth, Memory Profiling, Algotrading
**Interests**: Deep-water spearfishing, alpine skiing, trumpet, windsurfing, cycling, survivalist camping