

**Alan Cao, Ph.D.**  
**Senior Quantitative Developer / Engineering Lead**

*Rye Brook, NY / 914-815-6048 / alan2003@gmail.com / U.S. Citizen*

**PROFESSIONAL SUMMARY**

Senior Quantitative Developer and Engineering Lead with 15+ years of experience designing and optimizing high-performance financial systems across Morgan Stanley, Alliance Bernstein, Morningstar and UBS. Skilled in C++17/20, Python, C#, web development, database, Linux, Windows, cloud, AI/ML. Specialty at quantitative analytics in equity, fixed income, foreign exchange and wealth management. Adept at coordinating cross-functional teams and delivering scalable solutions that improve output accuracy and computation throughput. CFA Candidate III.

**TECHNICAL EXPERTISE**

- **Programming:** Python, C++17/20, C#, .net, STL, TypeScript, SQL, React, ASPX, Java, Bash
- **Frameworks/Platforms:** Google Benchmark, Google Test, Boost, PyTest, MKL, Http, REST, Docker, Azure Batch, Bazel, XMake, MSQ, Apache, IIS, Linux, Windows Server, SSRS
- **Analytics & Modeling:** Quantitative Models, Data Analytics, AI/ML (NumPy, Pandas, SciKit, Matplotlib)
- **Databases:** MS SQL Server, PostgreSQL, Sybase, MongoDB, Kdb+
- **Domains:** Equity, Fixed Income and FX Derivatives Analytics, Trade Surveillance and Compliance, Wealth Forecasting, Portfolio Management, Financial Engineering, Market Data (ECN, Bloomberg, EVB)

**PROFESSIONAL EXPERIENCE**

**Morgan Stanley / RiskCare — New York, NY**

*Senior Quantitative Developer Contractor / 2023 – Present*

- Led optimization of Morgan Stanley's Equity Pricing and Risk Library using SIMD/AVX2, compile configuration optimization, math library code refactoring. Optimized modules achieved 10-60% performance enhancement across math libraries, matrix computation, Monte Carlo path evolvers, etc. (C++, STL, Bazel, Linux, MKL, Google Benchmark, Boost).
- Created regression/unit testing frameworks to allow real-time analytical model change verification (Python, Pytest, PyBind, Pandas).
- Architected and implemented next-generation trade surveillance reporting and alert analysis platform integrating market data, AI/ML models, and historical analytics (Python, Pandas, SciKit, Kdb+, PostgreSQL, MongoDB, MS SQL).
- Built web-based workflow reporting platform for private lending operations (React, TypeScript, Bootstrap).

**ATC Technology Inc. Rye Brook, NY**

*Founder / 2020 – 2022*

- Developed bioinformatics data processing system for Drosophila and human genetic enrichment expression analysis. The system has been used by research institutes for trial usage (C++, C#, Python).

**Alliance Bernstein L.P. — White Plains, NY**

*Team Lead / Development Manager | 2006 – 2020*

- Led development of the Wealth Forecasting System — a Monte Carlo-driven portfolio modeling engine for market simulation and wealth projection (C++, C#, MS SQL, ASPX, JavaScript).
- Led platform migration to Azure and microservices modernization (C#, Azure Batch, RESTful APIs, SQL).
- Directed Instant Advice mobile platform initiative, integrating financial planning on iPad (C#, Objective-C, mono).
- Mentored developers and coordinated collaboration between private client analysis and engineering teams.

**Morningstar Inc. — Chicago, IL**

*Team Lead, Data Infrastructure | 2003 – 2006*

- Designed and built Morningstar's global data delivery platform processing millions of daily requests (C#, C++, ASPX, SQL),
- Developed an innovative distributed file system outperforming standard I/O and backup operations by >50× (C++, C#).

**Embedded Internet Solutions, Inc. — Santa Clara, CA**

*Director of Software Development / Founding Employee | Jul 2000 – Nov 2003*

- Developed and led the company's first commercial product, the iPanel™ browser core, a market-leading embedded browser known for its compact footprint, high performance, and stability across 10+ semiconductor platforms (C/C++, TCP/IP, VxWorks, ARM, RISC, x86)
- Directed end-to-end product architecture, UI design, QA, and customer support.
- Partnered with executives on corporate strategy, product roadmap, cross-country team coordination, and fundraising, helping scale the organization from inception to 100+ employees.

**UBS — Chicago, IL**

*Software Developer, FX Options Desk | 1999 – 2000*

- Developed pricing, settlement, and transaction-tracking software for FX option trading (C++, Sybase, Visual Basic).
- Supported front office applications for FX option trading desk, covered pricing, settlement and transaction tracking software. (Visual Basic, C++, Sybase).

**EDUCATION**

Ph.D., Molecular Bioinformatics — University of Illinois at Urbana-Champaign

M.S., Computer Science — University of Illinois at Urbana-Champaign

B.S., Biochemistry — Peking University, Beijing, China