

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

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PROFESSIONAL SUMMARY

Senior Quantitative Developer and Engineering Lead with 15+ years of experience designing and optimizing high-performance financial systems across Morgan Stanley, AllianceBernstein, and UBS. Skilled in C++17/20, Python, C#, Linux, Windows, cloud, performance optimization, AI/ML, 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, TypeScript, SQL, React, Bash

Frameworks/Platforms: Bazel, XMake, Google Benchmark, Google Test, Boost, PyTest, MKL,

Boost, Http, REST, Azure, Docker, Azure Batch, MSQ, Apache, IIS, Linux, Windows Server, SSRS

Analytics & Modeling: Monte Carlo Simulation, Quantitative Risk 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 development and optimization of Morgan Stanley's Equity Pricing and Risk Library across analytics modules including path evolvers, basic math libraries, matrix computation etc. using SIMD/AVX2, compile configuration optimization, math library code refactoring (C++, STL, Bazel, Linux, MKL, Google Benchmark, Boost).
- Created regression/unit testing frameworks to allow real-time analytical model change verification (Python, PyTest,, Pandas).
- Architected and implemented next-generation trade surveillance and alert analysis platform integrating real-time data, AI/ML models, and historical analytics (Python, Pandas, SciKit, Kdb+, PostgreSQL, MongoDB, MsSQL).
- 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 data 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 architecture and implementation of the Wealth Forecasting System — a Monte Carlo-driven portfolio modeling engine for high-net-worth clients.
- Led Azure migration and microservices modernization (C#, Azure Batch, RESTful APIs, Redis Cache, Docker).
- Directed Instant Advice mobile platform initiative, integrating financial planning on iPad (C#, Objective-C).
- 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

- Designed and built Morningstar's global data delivery platform processing millions of daily requests (C#, C++, ASPX, SQL),
- 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).
- Developed option pricing verification module to the OptiX global FX options pricing system.

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

HONORS & AWARDS

- Reach Award for IT Excellence, AllianceBernstein (2007, 2014)
- Employer of the Year, Embedded Internet Solutions (2002)
- President's Volunteer Service Award, 2021–2022