Charles L Blake, cb@mit.edu, 617-448-3172

EDUCATION

Research Faculty, Computer Science - **Massachusettes Institute of Technology** 2000-2004
Master of Science in Physics - **University of California at San Diego** 6/94
Bachelor of Science in Physics - **California Institute of Technology** 6/91

OVERVIEW

I know bottom-to-top high-, medium-, & low-frequency data processing, analysis, & trading of equities & options. I have strong experience in developing & running successful proprietary quantitative trading strategies and also low-level computer systems, numerical & statistical programming & big data science & management. I currently run a large international book. Strategy has 2 week turnover, long-term realized Sharpe 3+ performance, good recent returns.

Certifications

FINRA Series 63; Series 7; Series 55; Active Registration

Skills

Low-Level Programming	Strategy Research	Option Pricing
Algorithms & Data Structures	Performance Analysis	Numerical Methods
OS & Network Research	Portfolio Optimization	Theoretical & Applied Stats

Platforms

Unix (Linux for 20 years; maintained some core utilities early on, FreeBSD, OpenBSD, HPUX, SunOS 4.*/Solaris 5.*, IRIX, Ultrix, AIX), DOS, Windows 3.1→present

Languages

C/ C++	Zsh/Bash/sed/awk	Mathematica	
Python	HTML/CGI/Javascript	FORTRAN	Many Random &
Cython	Some Matlab, SAS	some R, Java	Miscellaneous

EXPERIENCE

PORTFOLIO/INVENTORY MANAGER/RESEARCHER;$1B fund - Citigroup 2009-present

- Managing $410x$410 MUSD quantitative equity portfolio in large US, EU, JP universe.
- Generalized & Improved 2nd Generation Prediction Company Strategies
- Design & implementation of ARCA/NASD colocated order book (sub-μs software response)
- 2000X speed-up & generalization of common risk book portfolio optimization strategy
- Built tick and quote farm (hardware-limited throughput was 10X better than KDB)

QUANTITATIVE STRATEGY RESEARCHER - Millenium/WorldQuant 2007-8

- Developed cross-sectional time series DB and analysis platform. Typical operations below 25 cpu clock cycles per stock per time sample per cpu, including expensive order statistics. Suitable for massive scale back-testing, re-sampling, and non-linear risk optimization techniques.
- Deployed fully automatic, global long-short equity portfolios based on fundamental, technical, and forward looking data; realized Sharpe Ratio 2.8 (21%/7.5% vol) for 2008. Backtests at Sharpe 4 in earlier, years. Realized 2009 trading of 48% return on capital after costs.

QUANTITATIVE ANALYST - Soros Fund Management 2006

- Research, development, & back-testing of various promising quantitative portfolio selection and portfolio optimization strategies via statistical models using fundamental and macro data.
- Automated data retrieval, cross-checking, & cleaning for a wide variety of data types, styles, and frequencies. Wrote needed format converters for Matlab, SAS, Python, & C.

QUANTITATIVE ANALYST - D.E. Shaw 2005

- Investigated infrastructure issues for option market making system.

MODELING&QUANTITATIVE DEVELOPER - Peak6, LLC 2004-2005

- Callback-style custom analysis DB & simulator engine for tick data. 5 min/market year.
- Developed long-short stock pair trading system. Pair selection used many novel cointegration statistics. Numerical&graphical presentation of trade ideas, monitors, watch lists, FIX/REDI-trading. Manual piloting got 85% winning trades w/median winners making $.30/share.
- Wrote non-parametric change-point detection algo/studied asset return distribution stability.
- Historical event analysis system forecasting vols entering epochs with known higher risk.
- Implemented option pricing numerical methods library w/extended greeks, rich dividend structure, full yield curve, varying forward volatility, robust convergence acceleration.
- visualization tool for risk-neutral price probability density extracted from options data.
- built/maintained multi-TB Linux box for OPRA market data record/re-broadcast/analysis.

RESEARCH FACULTY in OSes&Nets - MIT LCS/CSAIL (Publications Below) 6/00 to 1/04

- High-resolution arrival time-based, multi-router congestion sharing & capacity estimation.
- Wrote a fast, flexible database for flow-oriented large-scale packet trace/event analysis.
- Delineation of relevance of routing optimization in reliable distributed hash tables.
- Extensions to traditional percolation models for radio network asymmetry/inhomogeneity to understand potential for asymmetric routing at higher layers. Used real US Census data.
- Explored different sensor coverage models including energy-bounded sensor avoidance paths.
- Fully automatic adaptive probability density estimation (algorithm and command-line tool).
- Analysis of ad hoc wireless network capacity and scalability.

SPONSORED RESEARCH STAFF - MIT-LCS, Parallel & Distributed OS group 1998-2000

- **Supervisor/Collaborator of Student Research**. Projects included:
  – **networking**: DNS traffic analysis, packet filters, DoS attack detection, network file systems.
  – **operating systems**: load forecast-based scheduling, drivers, session migration, secure deletion
- **Individual Researcher**. Unpublished research includes:
  – novel small sample bias adjustment technique for maximum likelihood estimators
  – fast implementation of an exact multinomial distribution equality test
- **Principal Exokernel Maintainer**. Included work on: exokernel file system security, applications of hierarchial capabilities, dynamic packet filters for active network nodes, SMP issues in exokernels, library OS service composition, DARPA quarterly progress reports

DISTRIBUTED SYSTEMS RESEARCHER - (BBN, now Verizon) Cambridge 1997-1998

- Architect, designer, implementator of stateful object replication system for a CORBA ORB.
- Architecture and design work on a collaboration system based on a weak-consistency distributed shared memory with attention to quality of service dynamic adaptation.

SOFTWARE DEVELOPER - Bolt,Beranek,&Newman (BBN) San Diego 1994-1997

- Developed a fast, flexible C preprocessor-based macro library for C++ STL-like containers
- Developed a simple workflow system using the CRONUS distributed OS
- Ported the CRONUS development and runtime system to LINUX
- Participated in design/implementation of the ARPA ATD architecture.
- Developed a portable Motif dialog library; learned Motif and Xmt Rapid App Dev
- Administered a network of SUNOS, Solaris, HP-UX machines (NIS, NFS, e-mail, ...)

TEACHING ASSISTANT - UCSD Physics 105 Fall 91, 92, 93; Spring 92, 93, 94

Computational Physics and Numerical Methods.
Guest-lectured; taught computer lab sessions; grading; solution preparation in C, $C{+}{+}$, and Fortran; held office hours for individual consultation. Recommended for a teaching award.

TEACHING ASSISTANT - UCSD Physics 2BL Winter 93, 94

Introductory Laboratory in Mechanics and Electricity.
Held pre-lab lectures, lab sessions, office hours; graded notebooks and exams.

SOFTWARE DEVELOPER - Caltech Physics Dept Winter, 91

Authored a nonlinear, errors-in-variables curve fitting and statistical data analysis package in *Mathematica*. Students used for sophisticated analyses of data collected in physics labs.

TEACHING ASSISTANT - Caltech Physics 3 & 4 Spring 90, 91

Freshman & Advanced Freshman Physics Laboratories.
Held pre-lab lectures, lab sessions, progress review meetings; graded notebooks.

PUBLICATIONS

Sachin Katti, Dina Katabi, Charles Blake, Eddie Kohler, and Jacob Strauss, *MultiQ: Automated Detection of Multiple Bottlenecks Along a Path*, ACM IMC, October, 2004.

Rodrigo Rodrigues, Charles Blake *When Multi-Hop Peer-to-Peer Routing Matters*, International Peer-to-Peer Systems 2004, La Jolla, December 2004.

Charles Blake, Dina Katabi *Cross Traffic: Noise or Data?*, Bandwidth Estimation 2003, San Diego, December 2003.

Charles Blake, Rodrigo Rodrigues, *High Availability, Scalable Storage, Dynamic Peer Networks: Pick Two*, Proceedings of the 9th Workshop on Hot Topics in Operating Systems (HotOS '03), Lihue (Kauai), Hawaii, May 2003.

Charles Blake, Steven Bauer, *Simple and General Statistical Profiling with PCT*, Proceedings of the 2002 USENIX Annual Technical Conference (USENIX '02), Monterey, California, 2002.

Dina Katabi, Charles Blake, *A Note on the Stability Requirements of Adaptive Virtual Queue*, MIT-LCS-TM-626, 2-13-2002

Dina Katabi, Charles Blake, *Inferring Congestion Sharing and Path Characteristics for Packet Interarrival times*, MIT TR-828, December 2001.

Jinyang Li, Charles Blake, Douglas S. J. De Couto, Hu Imm Lee, Robert Morris, *Capacity of Ad Hoc Wireless Networks*, Proceedings of the 7th ACM International Conference on Mobile Computing and Networking (MobiCom '01), Rome, Italy, July 2001.