

BRIAN G. PETERSON

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SUMMARY

Senior quantitative financial analyst, technical architect, and project delivery leader with broad-based delivery, consulting, and line management expertise. Over fifteen years experience in design, construction, and integration of technically innovative systems in multiple industries including insurance, mortgage, health care, automotive, manufacturing, investment banking, brokerage, alternative investments, and proprietary trading. Seeking to develop strategies for asset managers and hold direct P&L responsibility in addition to research and development tasks.

APPLICABLE SKILLS

Quantitative Modeling: I have developed and productionized quantitative models for trading strategies, valuation, performance and risk analysis, and portfolio construction for asset managers, proprietary trading, investment banks, and exchanges. I have demonstrated skills across equities, derivatives, fixed income, structured products, and hedge funds. I am skilled at understanding, using, and replicating published quantitative models and also at developing and refining new models. I regularly write and speak on quantitative topics in major journals and conferences, and have been asked by the largest financial press (Springer-Verlag) to write a book on quantitative analysis.

Dynamic Hedging: We developed quantitative models to calculate the correct hedging instrument for portions of the portfolio based on the correlations of the combined portfolio to several highly liquid derivatives. This capability gives a portfolio manager both the ability to "buy insurance" when there is a good return stream to protect, and to react to sudden changes in the markets without having to unwind a large number of positions that you might still be confident of over a longer time frame. This type of hedging is relevant and important across asset classes and investment horizons.

Quantitative Investment Screening: Returns for most asset classes, investment styles, and funds are not normally distributed, so statistical methods that rely on or assume a normal distribution are very fragile for analyzing these assets. I have developed and published **R** statistical analytics functionality that match the latest econometric research in analyzing asset classes for risk, autocorrelation (identifying problems of illiquid or manually marked books), persistence of returns, style analysis and style drift, factor modeling, portfolio construction, and other areas.

Heuristic Screening: Investments in a portfolio of alternatives involve both heuristic and quantitative components. We assisted a large institutional client in standardizing the heuristic process for screening investments, helping to set guidelines for describing what traits in an asset should be considered beyond direct performance analysis.

Portfolio Construction: Choosing the size of an investment is a complementary process to choosing the instrument to invest in. I've developed and profitably applied portfolio construction tools for proprietary trading, structured products, and hedge fund style selection optimizers for a fund of funds or institutional setting, as well as a utility function based optimizer for asset allocation (asset weighting) within a single or multi-style/strategy portfolio. I have evaluated or used multiple different optimizer methodologies to make sure that the correct optimization method is used for portfolio construction based on the nature of the specific portfolio.

Trade Processing and Reference Data: I have developed reference data systems and analytics engines for major asset managers, trading firms, and investment banks. We developed and licensed to our clients a middle and back office trade processing, reconciliation, and P&L accounting system that handled 300,000-500,000 trades per month across more than 12 prime/clearing brokers and 50+ prime broker accounts in multiple currencies and instrument/asset classes. Our **R** trade blotter and instrument reference data packages have been used on tens of thousands of trades as a component of creating and evaluating automated trading strategies.

Process Discovery, Analysis, Automation: Productivity growth often hinges upon the ability of an organization to discover, analyze, refine, and automate business processes that were once ad-hoc and manual. I have deep experience in process discovery and analysis from my years as a management consultant, and have applied these skills in proprietary trading, the hedge fund industry, at major asset managers, and investment banks.

Technology Expert: I have extensive technical implementation expertise across most modern computational technologies. Once processes have been identified as candidates for automation, an implementation path must be chosen that is both efficient and economical. I can manage and add value to the entire technology project life cycle.

METHODS and TECHNOLOGIES

Strategy Modeling: statistical arbitrage, mean-reversion (spreads and outrights), regression/factor models, industry/style portfolios, trend models, and technical indicators across all asset classes and frequencies from minutes to years

Analytical Methods: non-normal distribution analysis, Risk-adjusted return analysis, VaR (*see Risk below*), correlation analysis, Sharpe, Sortino, Omega, cointegration, multiple pricing models (*see Pricing*), multiple regression methods (*see Regression*), multiple optimization methods (*see Optimization*)

Risk: drawdown analysis, semivariance, downside deviation, simulated scenario risk, Monte Carlo VaR, Basel II VaR/capital metrics, Cornish-Fisher VaR, component risk decomposition, Expected Shortfall (ES/CVaR), shock/slide scenario analysis, default models (loans/bonds)

Pricing: factor analysis, PCA, technical indicators (ranges, momentum, volatility, volume), Monte Carlo simulations, Bayesian, robust, ARIMA, GARCH, term structure(bonds/FI), discounted cash flow (bonds), 2-4 moment CAPM

Optimization: optimize non-convex portfolios utilizing brute force, heuristic rules, linear programming, random portfolios, quadratic objectives, simulated annealing, Differential Evolution, and utility based optimization approaches

Analytical Tools: R/S/S-Plus, Rmetrics, SPSS, SAS, Mathematica, Maple, MatLab/Octave, MathCAD, Bloomberg, CQG, Pertrac, RiskMetrics, Intex, CreditMetrics, C/C++, Python, kdb/Q

PROFESSIONAL EXPERIENCE

Breakwater Trading, Chicago, IL **2009-May 2010**

Sr. Financial Engineer, Statistical Arbitrage

- Developed and refined mean reversion, relative value, and trend following quantitative strategies.
- Applied active risk analysis and portfolio optimization to improve performance of a portfolio of strategies.
- Introduced high performance computing clusters to the organization to allow for complex quantitative analysis.

Canadian Imperial Bank of Commerce, global **2008-2009**

Senior Risk and Quantitative Analyst (ED-level term contract)

- Analyzed and created models for risk and valuation of a \$15B structured products portfolio (CDO,ABS,CLO).
- Led team and negotiations in due diligence and purchase of a \$4.5B CLO manager.
- Provide guidance on transitioning from a run-off book to active pursuit of distressed opportunities.

Diamond Management and Technology Consultants, Chicago, IL **2007-2008**

Knowledge Leader – Finance

- Conduct research in new risk and portfolio construction methodologies.
- Provide leadership in quantitative methods and technologies for capital markets and investment management.

Explorer Fund Advisors, Chicago, IL **2003-2006**

Chief Technology Officer, Lead Quantitative Analyst

- Develop quantitative investment models, portfolio construction algorithms, and portfolio optimization.
- Calculate risk and valuation metrics: Automate specific hedge selection for a portfolio or instrument.
- Managed the technology and strategy consulting business and resources for Explorer's institutional clients.

CryptoRights Foundation, San Francisco, CA **2002-2003**

Lead developer – Highfire

- Lead design and development of a secure cryptographic platform for use by human rights workers.
- CryptoRights is a NGO dedicated to the protection of human rights workers and the information they collect.

eLoyalty, Lake Forest, IL **1994-2002**

Vice President – Technology (started as a Programmer/Analyst/Sr. Consultant)

- Designed and developed large, technically complex systems using a wide range of technologies.
- Project Lead and Subject Matter Expert for teams of up to 50 resources with budgets of \$2-20 million/yr.

PD&C, Inc., Madison, WI **1989-1994**

Owner

- Grew the company from 1-15 employees. Successfully sold the company to my largest client.
- Designed and developed several applications in the virtual reality and scientific simulation fields.

RECENT and PRE-PRESS PUBLICATIONS

Portfolio Optimization with Conditional Value-at-Risk Budgets. Brian Peterson, Peter Carl, and Kris Boudt. Journal of Portfolio Management. 2010. In revision.

Business Objectives and Complex Portfolio Optimization. Brian Peterson and Peter Carl. Seminar presentation at R/Finance 2010.

Differential Evolution (DEoptim) for Non-Convex Portfolio Optimization. David Ardia, Kris Boudt, Peter Carl, Katharine Mullen, Brian Peterson. R Journal, In revision, available online at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1584905

TradeAnalytics: a collection of R packages for trading and price-based analysis. Brian Peterson, Peter Carl, et. al. 2009-2010. Available online at: http://r-forge.r-project.org/R/?group_id=316

Analysis of Multivariate Moments and Co-moments for Financial Time Series. Brian Peterson, Peter Carl, and Kris Boudt. Journal of Statistical Software (*target*). In revision.

Book(s): *Applied Investment Performance and Risk Analysis and Portfolio Attribution, Construction, and Management*. Brian Peterson and Peter Carl. Under contract with Springer-Verlag. In revision.

Performance Analysis in R. seminar presentation given at R/Finance Chicago 2009 and R/RMetrics Conference Meielisalp, Switzerland, 2009. available online at [R/Finance website](#)

Estimation and Decomposition of Downside Risk for Portfolios with Non-normal Returns. Kris Boudt and Brian Peterson and Christophe Croux. Journal of Risk. Winter 2008 11(2) 79-103. available online at: http://www.thejournalofrisk.com/public/showPage.html?page=jor_v11n2a4

Component VaR for a non-normal world. Brian Peterson and Kris Boudt. RISK Magazine. November 2008 78-81. also reprinted in AsiaRISK. available online at: <http://www.risk.net/public/showPage.html?page=823941>

Hedge Fund Portfolio Selection with Modified Expected Shortfall. Kris Boudt and Brian Peterson and Peter Carl. Computational Finance. May 2008. available online at: <http://library.witpress.com/pages/PaperInfo.asp?PaperID=18906>

Portfolio Risk Decomposition using Modified VaR and Expected Shortfall. Brian Peterson. MFA Conference. March 2008.

Ask the Experts: Cornish-Fisher VaR 101. Brian Peterson. Institutional Investor Advisor. Nov 2007. available online at <http://www.bfinance.co.uk/inst/article.do?serieId=1&docid=N12560>

Exploratory Data Analysis in Finance using PerformanceAnalytics. Brian Peterson and Peter Carl. presented at the User! International R User and Developer conference, Ames, Iowa, August 2007.

Keynote: *Portfolio Selection, Risk Analysis, and Optimization*. Brian Peterson. presented at the R/RMetrics International User Conference in Meielisalp, Switzerland, July 2007.

PerformanceAnalytics: An R package for Performance and Risk Analysis in Finance. Brian Peterson and Peter Carl. 2004-2010. <http://cran.r-project.org/src/contrib/Descriptions/PerformanceAnalytics.html>

I am a peer reviewer for several publishers and journals in finance and technology.

Brian is also on the program committee for the global R/Finance and User! conferences, and has previously served on the program committee for MFA conferences and R/Rmetrics.

Industry and Academic references available upon request.