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<http://www.aqscs.net/publications>

Summary

- Quantitative strategist/trader at NYC-based multi-strategy hedge fund (1+ years): discovery, implementation, multi-year tick-based backtesting and fully automated paper trading of mid-frequency intraday strategies (holding period from 15-20min to several hours) for baskets of ETFs and liquid US equities with typical Sharpe ratio from 3 to 5 and ability to use up to \$100mil of nominal capital. Several months of real-capital trading (up to \$12mil).
- Head of quantitative research and quantitative strategist at multi-billion NYC-based multi-strategy hedge fund (6 years): outlined theoretical foundations, implemented, and tested a generic meta-framework for the fully automatic discovery of regime-independent portfolios of multi-frequency trading strategies. Confirmed validity of the approach in real systematic intraday and daily ETF and equity trading (automatic and semi-automatic) with test capital up to \$40mil. Proposed and implemented misc. proprietary systems for trading desk and risk management.
- Initial financial experience (1.5 years): research and software development experience in a large financial company: design, development, and support of the analytic modules for a new generation of credit-risk management system.
- 5+ years of unique interdisciplinary experience in a leading consulting company conducting cutting edge research in complex system modeling, applied machine learning and artificial intelligence as well as proprietary software development.
- Misc. consulting services.

Education

1996: Ph.D. in Physics, West Virginia University/Naval Research Laboratory (Washington D.C.), USA.

1989: M.S. in Physics (diploma with excellence), Moscow Institute of Physics and Technology, Russia.

1987: B.S. in Physics, Moscow Institute of Physics and Technology, Russia.

1983: Diploma with excellence from Kolmogorov High School of Physics and Mathematics at Moscow State University, Russia.

Certifications

Series 7 license (general securities representative)

Financial Skills and Background

- Strong background in all major types of statistical arbitrage and systematic/algorithmic trading. Proposed and developed a novel proprietary system for automatic discovery of the multi-scale regime-independent strategies. Successful testing in real intraday and daily trading with capital up to \$40mil.

- Author of many original refereed publications: A novel boosting-based framework for portfolio strategy discovery and optimization, ensemble learning frameworks in various financial applications, volatility forecasting using support vector machines, etc.
- Substantial general and technical background in fixed income analytics, derivative pricing, interest rate modeling, and risk management frameworks. Ability to design, implement, and integrate required models.
- Experience and understanding of the enterprise-wide quantitative development and support from the very short-term trading-desk-type projects to the longer-term risk management and misc. back-office projects.

Numerical and Analytical Skills

- Extensive experience with numerous numerical and analytical methods of computational and theoretical physics: partial-differential and integral equations, linear algebra, stochastic methods, methods of nonlinear dynamics, etc.
- Development of large multi-dimensional numerical simulation codes (multi-moment fluid and Particle-In-Cell) and their extensive application for complex system modeling.
- Strong background and application of the advanced pattern recognition and time-series prediction techniques (including neural nets, support vector machines, and ensemble learning algorithms) to real life problems such as real-time space weather forecasting, analysis of market daily and intraday data, and biomedical quantitative modeling.

Technology Skills

Extensive use of personal, mini-, and super- computers during last 20 years: PC, IBM RISC and Silicon Graphics workstations, CRAY C90 and T90, and VAX.

Programming languages: .Net platform (5+ years), C++/C (10+ years), Java (2+ years), Fortran (15+ years), Visual Basic, VBA, Matlab, etc.

Operating systems: Extensive use of Windows, Unix/Linux, VAX VMS.

Databases: Comprehensive background and experience with relational databases and SQL.

Research Experience

- Cutting-edge research in theoretical and computation plasma physics, space physics, and multidisciplinary complex system modeling resulted in ~100 original high-quality papers and conference presentations. Made significant contributions in several different areas of plasma and space physics. These include 5 frequently cited publications in Physical Review Letters. Several experimental groups in US and abroad devoted multi-year successful research and PhD programs for a direct study and confirmation of my original theoretical predictions.
- Recent interdisciplinary publications/presentations (also frequently cited) include results on applications of the dynamic neural networks, support vector machines, ensemble learning algorithms and other novel machine learning and statistical techniques to financial markets, space weather forecasting, and other complex systems.
- A novel boosting-based framework for the portfolio strategy discovery and optimization was proposed and outlined in my recent publications and extensively tested to confirm its validity for real-market applications.
- Full list of publications is available at <http://www.aqscs.net/publications>

Honors

- 2001 Naval Research Laboratory annual award for the best paper (Physical Review Letter publication on dusty plasmas).
- Hot spot award winner at FannieMae. Nominee for the 2001 Chairman's award.
- Certificate for excellence in science and technology from Science Applications International Corporation (1999).
- Several invited talks at major US and international conferences (1996-2001).
- Certificate for excellence in academic performance from the Moscow Institute of Physics and Technology (1989).
- Certificate for excellence in academic performance from the Physical-Mathematical high school of Moscow State University (1983).
- Certificate of the finalist in the open Physics Olympiad, Moscow Institute of Physics and Technology (1982).
- Certificate and award for the 1-st place at the regional Chemistry Olympiad for high school students, Russia (1981).

Employment History

June 2010 – present: Misc. consulting on systematic trading. Development of proprietary model-combination and multi-objective optimization systems for financial and biomedical applications.

Dec. 2009 – June 2010: Quantitative strategist/trader at QRT Capital LLC (NYC-based hedge fund). Systematic intraday trading: ETFs and US equities. Strategy discovery and simulation using boosting-based system. More than 3 months of real-capital fully-automated trading (up to 5mil).

Sep. 2008 – Nov. 2009: Vice president (quantitative strategist/trader) at Millenium Partners (NYC-based multi-billion hedge fund).

Main Projects:

- Designed and implemented generic execution system for intraday variable-capital strategies discovered by boosting-based optimization for fully-automated trading inside proprietary MLP execution framework.
- Performed extensive multi-year tick-based backtesting and fine-tuning of the mid-frequency intraday strategies (holding period from 15-20min to several hours) for baskets of ETFs and liquid US equities. Obtained comparable preliminary results for index futures.
- Many obtained strategies with typical Sharpe ratios from 3 to 5 and ability to use up to 100 mil of nominal capital were extensively tested in the fully automated paper trading. The same strategies can also be used with even larger capital by expanding equities universe and use of futures.
- For several months used up to 12mil of real capital in fully automated intraday trading to confirm validity of backtesting and paper trading results.

Sep. 2003 – July 2008: Head of quantitative research and quantitative strategist at Alexandra Investment Management, LLC (NYC-based multi-billion hedge fund).

Main Projects:

- Outlined theoretical foundations, implemented, and tested a generic meta-framework for the fully automatic discovery of regime-independent portfolios of multi-frequency trading strategies.
- Confirmed validity of the approach in real systematic intraday and daily ETF and equity trading (automatic and semi-automatic) with test capital up to \$40 million.
- Designed, implemented and supervised implementation of several custom execution systems and back-office add-ins for systematic trading.
- Proposed and implemented multi-expert bankruptcy prediction system, misc. pricing models, and other proprietary systems for trading desk and risk management.
- Supervised a team of quantitative researchers and analysts (up to 5 members) on misc. research and model implementation projects.

Feb. 2001 – Aug. 2002: Financial Engineer (research and development group), FannieMae (Washington, D.C.).

Main Projects:

- Designed and implemented several components of the new credit risk analytics library in C++ (on both Solaris and Windows NT platforms). Extensively used OO and template-based design.
- Proposed and designed XML-based macro language (“CreditML”) to describe prepayment, default/mitigation and other models in a uniform data-driven framework. Implemented core engine (in C++) for CreditML execution.
- Proposed a new adaptive system for the automatic generation of the optimal pricing grids that could significantly reduce the full time of new grids regeneration.
- Conducted research on new integrated risk management techniques including extreme value theory, copulas, new algorithms for portfolio optimization, etc.

Feb 2001 – Feb 2007: Consultant in science and technology, Science Applications International Corporation (McLean, VA).

Main Projects:

- Applying machine learning (neural networks and support vector machines) and statistical techniques to space weather forecasting and market volatility prediction (stock and foreign exchange). Developing new hybrid techniques for rare/extreme events forecasting.
- Consulting on usage and new applications of the 3-D multi-moment fluid and 2-D Particle-In-Cell codes for space, solar, and laboratory plasmas.
- Provided integrated framework of integral equation solvers for trapped ion modeling in dusty plasmas. Occasional consulting on usage.

Jan. 1997 – Feb. 2001: Research Scientist, Center for Energy and Space Research, Science Applications International Corporation (McLean, VA). Consultant at the Naval Research Laboratory (Washington, D.C.).

Main Projects:

- Applied different types of neural networks, support vector machines and other machine learning and artificial intelligence techniques to space weather forecasting from real-time spacecraft data. Majority of the numerical codes have been OO designed and written in C++ for both Unix/Linux and Windows NT platforms.

- Consulted a team of Java software engineers on rule-based and related artificial intelligence technologies to be used as “smart” engine for the distributed simulation and design system (NASA project). Proposed agent-like rule-based structure and implemented several prototypes (in Java) that use Jess as a rule-based engine. Proposed a framework for automatic rule generation and verification: several prototypes have been implemented.
- Discovered new plasma instability mechanisms that can consistently explain a number of phenomena in space and laboratory plasmas. Instability mechanisms have been directly verified and confirmed by several independent experimental groups around the world and are used for interpretation of space and laboratory data.
- Developed a set of multi-dimensional simulation codes (multi-moment fluid and Particle-In-Cell) and extensively applied them to model complex inhomogeneity-driven processes in space and laboratory plasmas. Majority of the numerical codes have been developed in Fortran 77/90 for Unix/Linux platforms.
- Developed a set of integral equation solvers and applied them to model trapped ion behavior in dusty plasmas. A 100 year old problem has been shown to have analytical solution in a form of integral equation with important practical consequences.

March 1995 - Dec. 1996: Research Assistant (PhD program), Department of Physics, West Virginia University. Research was conducted at the Naval Research Laboratory (Washington, D.C.).