

RALPH VINCE

Expert Witness & Consultant — Quantitative Finance, Trading Risk Management, Digital Assets

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SUMMARY OF QUALIFICATIONS

Quantitative finance practitioner, author, and cryptographer with more than four decades of work on position sizing, leverage, drawdown control, and portfolio construction. Originator of the optimal-f framework and the Leverage Space Portfolio Model, both published in peer-reviewed and trade-press form and widely cited in the professional trading literature. Prior engagements in index development and quantitative strategy for Dow Jones Indexes, the Dubai Futures Exchange, and the Abu Dhabi Investment Authority (ADIA). Since 2023, architect of a post-quantum digital-asset custody system, with published cryptographic schemes and pending US and European patents. Regular guest expert commentator on CNBC Arabia. Has lectured or presented papers on these topics at such esteemed institutions as the Massachusetts Institute of Technology, the London Chamber of Commerce, and the World Finance Conference, to name but a few. Available to opine on matters involving trading losses, leverage and suitability, risk-management practice, trading-system design, index methodology, and cryptocurrency custody and exchange mechanics.

Available for party-appointed expert work in US litigation and FINRA arbitration, and in international arbitration (ICC, LCIA, Swiss Rules), in English or French.

AREAS OF EXPERT OPINION

- **Position sizing, leverage, and margin:** whether the size and leverage of a trading program were consistent with stated risk tolerance and sound quantitative practice, including whether leverage alleged to be "excessive" was in fact consistent with growth-optimal allocation under the optimal-f and Leverage Space frameworks; quantification of expected drawdown and probability of ruin.
- **Risk-management practice:** adequacy of risk controls at advisors, funds, and proprietary trading operations; drawdown-constrained allocation; concentration and correlation risk.
- **Portfolio construction and optimization:** suitability of allocations, mean-variance and non-mean-variance methods, and the mathematics underlying performance and loss attribution.
- **Trading systems and strategies:** design, backtesting, overfitting, and evaluation of systematic and discretionary strategies, including volatility-breakout methodologies.
- **Index construction and methodology:** rules-based index design, licensing, rebalancing, and tracking, from engagements with major index providers.
- **Digital assets:** self-custody and key management, exchange and decentralized-exchange (DEX) mechanics, smart-contract behavior and audit, liquidity-pool economics, token valuation, and post-quantum cryptographic risk to blockchain systems.

PROFESSIONAL EXPERIENCE

Exsuperatus LLC (formerly LSP Indexes) — Founder

2010–present

Independent research and consulting in quantitative finance and cryptography; creator of performance indexes for institutional programs. Architect of Lemnicoin (LEMNI), a quantum-resistant, theft-resistant custody layer for Bitcoin and EVM-chain assets; designed the protocol, authored and audited its Solidity implementation, and deployed it to mainnet.

Dow Jones Indexes — Licensing of LSP Indexes

2010–2013

Allocation algorithms and LSP index methodology licensed by Dow Jones Indexes.

Abu Dhabi Investment Authority (ADIA)

1997–2000

Commodity Trading Room Team Lead and Index Constructor. Led the commodity trading room team and constructed rules-based indexes for the sovereign wealth fund.

Earlier career

1980s–2010

Consultant to dozens of hedge funds, commodity trading advisors, and money managers on trading-system development, position sizing, and risk management. Margin Clerk for accounts "OK'd to trade short option positions," Paine Webber Jackson & Curtis.

PUBLICATIONS

Books

- The Leverage Space Trading Model: Reconciling Portfolio Management Strategies and Economic Theory. Wiley, 2009.
- The Handbook of Portfolio Mathematics: Formulas for Optimal Allocation & Leverage. Wiley, 2007.
- Risk-Opportunity Analysis. 2012.
- The New Money Management: A Framework for Asset Allocation. Wiley, 1995.
- The Mathematics of Money Management: Risk Analysis Techniques for Traders. Wiley, 1992.
- Portfolio Management Formulas: Mathematical Trading Methods for the Futures, Options, and Stock Markets. Wiley, 1990.
- Q-Day: Quantum Computing, Blockchain, and the Cryptographic Cliff Ahead. Picture Perfect Verses LLC, 2026.

Papers — trading and portfolio mathematics

- Expectation and Optimal Allocations in Existential Contests of Finite, Heavy-Tail-Distributed Outcomes. Mathematics, 12(1), 11, 2024.
- The Ripple Effect of Daily New Lows (with L. Williams). Journal of Technical Analysis, Issue 74, pp. 30–44, Fall 2024. Winner of the Charles H. Dow Award.
- The Fallacy of Maximizing Risk-Adjusted Returns. SSRN 3731117, 2020.
- Diminution of Malevolent Geometric Growth Through Increased Variance. Journal of Economics, Business and Market Research, 1(1), pp. 35–53, 2020; updated second edition, SSRN 5160143, 2025.
- Expectation and Optimal f: Expected Growth with and without Reinvestment for Discretely-Distributed Outcomes of Finite Length as a Basis in Evolutionary Decision-Making. Far East Journal of Theoretical Statistics, 56(1), pp. 69–91, 2019.
- Optimal Risk Budgeting Under a Finite Investment Horizon (with M. López de Prado and Q. J. Zhu). Risks, 7(3), 86, 2019.
- Optimal Betting Sizes for the Game of Blackjack (with Q. J. Zhu). Journal of Investment Strategies, 4(4), pp. 53–75, 2015.
- Inflection Point Significance for the Investment Size (with Q. J. Zhu). SSRN 2230874, 2013.
- Dance Steps: A Statistical Quantification of Data Pair Similarities. SSRN 4185739, 2013.
- Benefits of Index-Tracking for the Single Family Office (with R. Wilkie). Family Office Association, 2013.
- A Dynamic Implementation of the Leverage Space Portfolio (with Q. J. Zhu and S. Malinsky). SSRN 2230866, 2012.
- Optimal f and the Kelly Criterion. Journal of the International Federation of Technical Analysts, No. 11, 2011.
- Optimising for the Highest Probability of Profit at Some Future Point in Time: A Prospect Theory Implementation for Portfolio Managers. Journal of the International Federation of Technical Analysts, 2009.
- Half-Cycle Differencing. Working paper, 1987.

Papers — cryptography and digital assets

- Settlement Ether and the Next Evolutionary Step in Cryptographically Stored Value. SSRN 6937058, 2026.
- Immediate Quantum and Wallet-Theft Protection for Bitcoin Without a Soft Fork: A Dual-Authority Custody Layer That Needs No Community Consensus and Runs Entirely on Layer 1. ResearchGate, 2026.
- Quantum-Resistant Hash-Based Cryptography via Lemniscate-Orbit Sampling. SSRN 5488706, 2025.
- Breaking the Representation Paradox: A Cryptographically Enforced Direct Democracy Protocol. SSRN 5363587, 2025.
- Why the Lemniscate-Anchored Isogeny Proposal (LAIP) Exhibits Superior Quantum-Resistance. SSRN 5231605, 2025.
- LemniCoin Ecosystem: Pioneering Quantum-Resistant Cryptography with Lemniscate-AGM Isogeny Encryption. International Journal of Cryptocurrency Research, 5(1), pp. 87–91, 2025.
- Lemniscate-Anchored Isogeny Encryption: A Commutative Class-Group Action Rooted at the Lemniscatic Curve. SSRN 5180911, 2025.
- The Lemniscate and the Arithmetic-Geometric Mean: A Modular Perspective. SSRN 5131683, 2025.

PATENTS AND APPLICATIONS

- US Patent Application 19/745,426 (continuation-in-part, filed July 17, 2026): quantum-resistant dual-authority Bitcoin custody construction (P2WSH-at-rest / Taproot-at-spend).
- US Patent Applications 19/574,363 and 19/651,712 (parent applications).
- European Patent Application 26300368.3 (filed June 10, 2026).

PRIOR TESTIMONY

No deposition or trial testimony in the preceding four years.

FEE SCHEDULE

- Document review, analysis, and report preparation: \$550 per hour.
- Deposition and trial testimony: \$750 per hour, four-hour minimum per day; testimony preparation billed at the review rate.
- Initial retainer of \$10,000, applied against invoices. Travel time billed at half the hourly rate; travel expenses at cost.

TECHNICAL SKILLS AND LANGUAGES

C/C++, Java, Python, JavaScript/Node.js, Solidity, LaTeX; Bitcoin Script, EVM/ERC-20, Uniswap V3, Diamond (EIP-2535) proxies; post-quantum signature schemes (Falcon, Dilithium). Fluent in English and French.