

# Aharon Zbaida - Resume

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### Multi-Disciplinary Engineer | ML Systems • Physical Systems • Project Leadership

Technical problem-solver with 20+ years applying engineering principles across software, construction, materials science, and biomedical systems. Combines deep machine learning expertise with hands-on experience in physical engineering domains—from building production ML pipelines processing 7,876 ticks/sec to managing construction projects and developing medical devices. Proven ability to lead technical initiatives, translate complex requirements into actionable solutions, and bridge the gap between computational methods and real-world physical systems.

## Core Competencies

### Machine Learning & Software Engineering

- **ML & Modeling:** PyTorch, XGBoost, LightGBM, CatBoost, neural networks, genetic algorithms (NEAT), reinforcement learning
- **Software Development:** Python, Java, C#, SQL, JavaScript/HTML/CSS; Docker, Kafka, Git, AWS Cloud
- **Data Engineering:** Time-series analysis, streaming data pipelines, feature engineering, experiment tracking
- **Evaluation Methods:** Out-of-time validation, regime analysis, bootstrap methods, backtesting, walk-forward optimization

### Physical Systems & Laboratory Science

- **Materials & Chemistry:** Wet chemistry, IR spectroscopy, thermogravimetric analysis (TGA), differential scanning calorimetry (DSC)
- **Mechanical Engineering:** Production tooling design, precision actuators, specialized device characterization
- **Biomedical Engineering:** Medical device development, tissue modeling, cardiac biomechanics, signal processing
- **Laboratory Skills:** Data acquisition systems, experimental design, material characterization, failure analysis

### Construction & Project Management

- **Project Leadership:** Residential & commercial construction, scheduling, budgeting, subcontractor coordination
- **Technical Skills:** Blueprint reading, CAD, construction document interpretation, permitting & code compliance
- **Trades:** Carpentry, drywall, flooring, framing, interior renovation, fixture installation
- **Operations:** Job site safety, scope management, stakeholder communication, change order tracking

### Cross-Functional

- **Languages:** Fluent in Hebrew (written and spoken)
- **Leadership:** Team management, technical mentoring, client relations, cross-functional collaboration
- **Communication:** Technical writing, stakeholder presentations, translating requirements across disciplines

## Professional Experience

### Entrepreneurial Track: Owner/Principal | Anitani Solutions LLC & Zbaida LLC | 2004–2022

Operated dual-track consulting practice providing both technical software development and construction project management services. Built sustainable business serving diverse client base while maintaining technical depth across multiple engineering domains.

**Software Development & ML Engineering (2010–2022)** - Researched and developed algorithmic trading systems with machine learning integration - Built trading robots and technical indicators for MetaTrader platform (MQL4/5) - Created C# automated trading applications for cTrader with Python neural network integration - Developed proof-of-concept feedforward neural networks for forex market prediction (PyBrain) - Achieved 50% return over 2.5 months with range-breakout strategy (619% annualized) in live trading trials - Technologies: Python, C#, Java, FIX protocol, machine learning, time-series analysis, MetaTrader, cTrader

**Construction Project Management (2004–2022)** - Managed residential and commercial renovation projects from preconstruction through completion - Coordinated scheduling, budgeting, subcontractor oversight, and daily site operations - Interpreted architectural drawings, engineering plans, and technical specifications - Ensured code compliance, safety protocols, and quality standards across all projects - Maintained licensed NJ Home Improvement Contractor status (NJHIC# 13VH10575800) - Provided property maintenance services for commercial and residential clients

### Independent ML Engineer / Researcher | Remote | 2020–Present

Focus on production-grade machine learning systems for algorithmic trading and quantitative finance.

**MuZero Trading Pipeline (Jan–Jul 2025)** - Built production-ready reinforcement learning system processing **7,876 ticks/sec** with **<100ms latency** - Engineered pipeline with **264 multi-timeframe technical indicators** across tick-to-daily timeframes - Achieved **10× throughput gain** and **60% memory reduction** (8.2GB → 3.2GB) with **3× faster training** - Integrated C++ MCTS with Python ML stack; developed dual dashboard monitoring (terminal + WebSocket) - Technologies: PyTorch, LightZero, Redpanda, SQLite, IoTDB, Docker

**FX Market Edge Prediction Research** - Trained **537K-parameter Temporal Convolutional Autoencoder** + 48 LightGBM models - Processed **224,955 samples** across **24 currency pairs** over 3 years of hourly forex data - Implemented cross-instrument feature sharing with  $24 \times 5$  tensor architecture - Applied rigorous temporal validation with aggressive quality filtering (50% retention rate) - Result: 50.1% direction accuracy - honest reporting of no statistically significant edge found - Technologies: PyTorch, LightGBM, OANDA v20 API, Docker

**Bible Codes Project (Open Source)** - Created browser-based ELS (equidistant letter sequences) search engine using client-side JavaScript - Implemented Boyer-Moore and Knuth-Morris-Pratt algorithms with prehashing for phrase optimization - Built Progressive Web App with offline capability via service workers - Project: [bible-codes.github.io](https://bible-codes.github.io)

### Founder & CTO | Peoples' FinTech LLC | Los Angeles, CA | 2017–2020

Founded and led development of quantitative trading platform integrating machine learning and event stream processing.

- Built Quant Workstation platform for strategy development, backtesting, and live trading
- Integrated ML models with event-driven architecture using Kafka/ksqlDB for fault-tolerant data streams
- Managed team of contract developers and outsourced engineering resources
- Developed web-based Expectancy Calculator tool for trading strategy evaluation (Dr. Van Tharp framework)
- Led technical architecture, product roadmap, and stakeholder communication
- Technologies: Python, Kafka, machine learning, event processing, Docker, cloud infrastructure

### Project Engineer | Daren Labs Scientific | Nes Ziona, Israel | 2014–2016

Dual-role combining IT infrastructure management with hands-on R&D across medical devices, materials science, and chemistry.

**IT & Infrastructure Leadership** - Managed onboarding of scientific startups: lab design and equipment setup for 8 laboratories and 12+ commercial tenants - Oversaw internet connectivity, computing networks, and IT infrastructure

for Innovation Center - Developed comprehensive time-tracking application for company-wide project cost allocation - Generated project cost estimates and quotes for diverse scientific work

**Scientific R&D Work** - Developed method for manufacturing physical models of diseased heart valve tissue (stress-strain curve matching) - Innovated indicator strips and manufacturing processes for personal hygiene products - Conducted R&D across multiple domains: dental restorative materials, product/material failure analysis, drug delivery systems - Technologies: Wet chemistry, IR spectroscopy, TGA, DSC, data acquisition systems, experimental design

#### **Programming Manager | Concord Wealth Management | Matawan, NJ | 2007–2008**

Led 8-person development team plus external consultants through critical platform migration and SaaS product development.

- Managed migration from Solaris to Linux Ubuntu on HP blade server infrastructure
- Oversaw development of SaaS wealth management platform for client banks and investment houses
- Handled help-desk operations, software installations, and daily reconciliation data downloads
- Technologies: Oracle, JDBC, PL/SQL, Java, Linux, Windows, Bloomberg Terminal, Morningstar

#### **Project Engineer | Cartridge Actuated Devices | Fairfield, NJ | 2003–2004**

Specialized engineering role developing precision actuators and mechanical systems for aerospace and industrial applications.

- Spearheaded adoption of data acquisition system for product performance characterization and quality testing
- Designed production tooling and assemblies for specialized actuation systems
- Translated contracts and safety standards into operating procedures for manufacturing and testing
- Collaborated with testing lab, QA, and production teams to implement safe manufacturing protocols
- Designed specialized tooling for precision actuator production and testing

#### **Operations Management Consultant | Gregg International / Gregg Uganda Tours | Uganda | Jul–Oct 2021**

Interim Chief Operations Officer for bicycle tourism company at Dubai Tourism Conference.

- Developed comprehensive web presence strategy including SEO and content generation plan
- Consulted on operations from local infrastructure development to international marketing
- Represented company at Uganda Tourism Board conference in Dubai

#### **Additional Roles**

**Benefits Representative / Licensed Life Producer | Globe Life American Income | Edison, NJ | May 2023–Present** - Tailored life insurance solutions ensuring financial security and regulatory compliance - Currently active license (expires Jan 2025): License #3002539663, NPN: 20710459

**Chemistry Teacher | The Princeton Review | 2003–2004** - Taught chemistry portion of MCAT test preparation courses

**Teacher | Temple Shalom | Bridgewater, NJ | 2012–2013** - Taught Jewish religious studies to fifth graders

#### **Education**

**B.S. Biomedical Engineering** – Rutgers University, Piscataway, NJ | 2001 - Senior Project: Developed Java-based image processing library and engine for rapid prototyping of operation pipelines (Advisor: Dr. Stanley M. Dunn) - Research Assistant: Mathematical modeling of cardiac muscle contractility; C++ signal processing and data analysis (Lab: Dr. Gary M. Drzewiecki) - resulted in peer-reviewed publication - Interdisciplinary curriculum: biomechanics, materials science, signal processing, thermodynamics, tissue engineering

**Associate's Degree in Chemistry** – Middlesex County College, Edison, NJ | 1998 - Foundation in analytical chemistry, organic chemistry, physical chemistry, and laboratory techniques

**Construction Management Certificate** – Middlesex County College, Edison, NJ - Coursework in project planning, scheduling, cost control, safety management, and blueprint reading

**Web Development in C# and .NET Framework** – John Bryce Hi-Tech Institute, Israel | 2015–2016 - Advanced Object-Oriented Development in C#, .NET Framework 4/4.5, Windows Forms - SQL & ADO.NET, HTML5, CSS3, ASP.NET WebForms, MVC4, WCF - JavaScript, jQuery, Azure cloud services

## Publications

Zbaida, A., Barton-Scott, T., Drzewiecki, G., Li, K-J, and Kedem, J. “**Series Elastic Fiber Damage in Stunned Myocardium.**” *American Journal of Hypertension*, v. 13, p. 51A, (2000).

Zbaida, Aharon. “**Using Neural Networks in Trade Recommendation Systems; a Proof of Concept Study.**” *Trading System Design: Blog For Sharing Information on Trading System Design*, Peoples’ FinTech, 2015.

Zbaida, Aharon. “**Tops and Bottoms – Characterizing Market Swing Price Levels.**” *Trading System Design: Blog For Sharing Information on Trading System Design*, Peoples’ FinTech, 2014.

Zbaida, Aharon. “**Super Smoother Filter.**” *Trading System Design: Blog For Sharing Information on Trading System Design*, Peoples’ FinTech, 2014.

## Certifications & Licenses

- **Life Insurance Producer** – Active through Jan 31, 2025 | License #3002539663, NPN: 20710459
- **NJ Home Improvement Contractor** – Previously Licensed | NJHIC# 13VH10575800 (not current)
- **Construction Management Certificate** – Middlesex County College

## Technical Skills Summary

**Programming Languages:** Python, Java, C#, SQL, JavaScript, C++, MQL4/5 **ML/AI Frameworks:** PyTorch, XGBoost, LightGBM, CatBoost, PyBrain, NEAT **Data & Infrastructure:** Docker, Kafka, Redpanda, ksqlDB, Git, AWS Cloud, SQLite, IoTDB, DuckDB **Web Technologies:** HTML5, CSS3, JavaScript, jQuery, ASP.NET, MVC, Progressive Web Apps **Scientific Instruments:** IR Spectroscopy, TGA, DSC, Data Acquisition Systems **Trading Platforms:** MetaTrader, cTrader, TradeStation, OANDA v20 API, FIX Protocol **Tools:** Bloomberg Terminal, Morningstar, Oracle, JDBC, Linux, Windows, CAD

## Open Source Projects

- **Bible Codes Project:** [bible-codes.github.io](https://github.com/bible-codes) | GitHub Repository
- **FX Market Edge Prediction:** [GitHub Repository](https://github.com/habirokrator/FX-Market-Edge-Prediction)
- **OANDA NEAT Trading Algorithm:** [GitHub Repository](https://github.com/habirokrator/OANDA-NEAT-Trading-Algorithm)
- **Anitrade Contributed Codebase:** [GitHub Repository](https://github.com/habirokrator/Anitrade-Contributed-Codebase)
- **Expectancy Calculator:** [Live Tool](https://habirokrator.github.io/expectancy-calculator/)
- **Habirokrator (Client Project):** [habirokrator.github.io](https://github.com/habirokrator/Habirokrator)