Stephen Seidel

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SUMMARY

Self-taught technologist with 15+ years of hands-on experience spanning software, hardware, and algorithms. Currently Tech Lead at Amazon Ring architecting AI-powered systems serving 3M+ messages weekly and leading team of 7 engineers across secure file infrastructure and customer communication platforms. Started coding at age 12 in Java, C, and C++, built electronics with Raspberry Pi, and shipped Android apps with 50K+ downloads before college. Strategically pursued Systems Engineering over Computer Science to master hardware (FPGAs, circuits, digital design) while maintaining software expertise. Published 3 research papers, built interpreter, and developed microsecond-latency parsers for high-frequency crypto trading. Perfect 4.0 GPA across all degrees (ASU Outstanding Graduate).

EXPERIENCE

Senior Software and Systems Engineer, Tech Lead | Amazon (Ring)

April 2023 - Present | Phoenix, AZ

- **Lead team of 7 engineers** across secure file upload infrastructure, AI chat systems, and customer communication platforms
- **Architected and launched ring.com's AI-powered chat service** from concept to production serving **3M+ messages weekly with 200K+ AI interactions**
  - Designed React UI and full backend architecture
  - Integrated Claude models with AWS Bedrock (Knowledge Bases, Agents, Guardrails)
  - Implemented streaming responses and production-grade AI guardrails
- **Built secure file upload system** with end-to-end encryption
  - Isolated containers per upload with pre-warmed pools for latency optimization
  - Intelligent media detection and mapping for images/videos/audio
  - End-to-end envelope encryption from browser to internal systems
- **Own multiple internal full-stack tools**: chat service, secure file upload, metrics dashboards, IVR microservices, and employee performance suite
- **Drive technical roadmap** balancing multiple product initiatives while mentoring engineers

Software Development Engineer, Tech Lead | Amazon (Ring)

February 2020 - April 2023 | Phoenix, AZ

- **Owned Ring's first in-house chat platform end-to-end**: Designed React UI, architected AWS backend (Lambda, API Gateway, DynamoDB), built agent control panel for customer support
- **Tech lead starting April 2021** guiding technical decisions for team of 4 engineers across full-stack applications
- **Application Security Certifier (2021-2023)**: Ran security certifications for Ring Marlin camera firmware (discovered/eliminated buffer overflow vulnerabilities), Alexa Bluetooth firmware libraries, and Alexa target determination services
- **Built phone callback application** enabling customers to receive calls from Ring support
- **Established team technical standards** for full-stack development, mentored engineers on AWS architecture and React
- **Developed microservices** for Ring ecosystem using Node.js, TypeScript, AWS CDK

Software Developer | Prognos Trading LLC

March 2019 - August 2019

- **Singly implemented hyper-efficient C++ parsers** and book builder for 12 cryptocurrency exchanges
- **Built zero-copy JSON parsing** and cache-optimized storage structures for minimal latency
- **Developed lock-free data structures** enabling microsecond-level decision making for high-frequency trading

Engineer II | American Express

January 2019 - February 2020

- **Head developer for enterprise data distribution framework** supporting new microservices network
- **Built lightweight library** with differential loading and ultra-efficient in-memory cache providing microsecond-level access to financial metadata
- **Implemented strict versioning** ensuring requests would fail rather than use stale data
- **Presented to engineering leadership** using Netflix Hollow and gRPC, who adopted framework for deployment at scale

Technology Intern | American Express

June 2018 - August 2018

- **Solved critical Angular-to-React migration** for commercial division by developing incremental component replacement approach
- **Rebuilt portions of React framework** to function within partial Angular environment, enabling gradual migration without site disruption
- **Converted APIs from REST to GraphQL**, compared performance across Spring Boot, Node.js, Vert.x
- **Trained company developers** on GraphQL and presented migration strategy to engineering leadership

Research Aide | Arizona State University

May 2017 - December 2018 | Tempe, AZ

- **Conducted wireless network performance research** using locating arrays
- **Developed C software suite** to build minimal locating arrays and identify relevant factors affecting network performance
- **Published 3 papers as primary author** at IEEE INFOCOM, IWOCA, and SpringSim conferences

Technology Intern | American Express

June 2017 - August 2017

- **Modernized legacy Spring codebase** in commercial/business cards division as part of architecture team
- **Rewrote multiple APIs in Spring Boot**, demonstrating elimination of boilerplate Java code
- **Implemented state-of-the-art testing**: Spring Test, Cucumber BDD, Rest Assured, PIT mutation testing, JMeter performance testing
- **Created Redis caching solution** addressing cache invalidation challenges
- **Received return offer** which was declined to pursue Master's degree

Intern | Fast Enterprises

May 2016 - August 2016

- **Met with Kansas City, MO City Hall employees** to understand tax software pain points
- **Completely redesigned business registration pages** with step-by-step wizard and intelligent auto-pull of data based on answers
- **Eliminated tedious manual entry** for city employees, improved experience for taxpayers and staff

Intern | SolutionStart Technologies

May 2015 - August 2015

- **Developed desktop tray application** using C#, .NET, Visual Studio for dental office IT solutions provider
- **Enabled direct case opening** with automatic diagnostics, eliminating phone support calls and speeding resolution
- **Configured servers, routers, and Fortinet firewalls** for dental office client deployments

EDUCATION

Master of Science in Computer Engineering | Arizona State University

December 2018 | GPA: 4.0/4.0

- **Concentration**: Computer Systems, Hardware/Software Co-design
- **Thesis**: Locating Arrays: Construction, Analysis, and Robustness
- **Focus**: Algorithms, networking, wireless systems research, combinatorial optimization

Bachelor of Science in Computer Systems Engineering | Arizona State University

December 2017 | GPA: 4.0/4.0

- **Outstanding Graduate Award** - Top graduating student in Computer Systems Engineering selected by faculty
- **Strategic Choice**: Deliberately chose Systems Engineering over Computer Science to gain hardware expertise (circuits, FPGAs, digital design, robotics) while already proficient in software
- **Focus**: Hardware/software co-design, digital design, FPGAs, robotics, circuits, systems engineering

Associate of Science | Central Arizona College

May 2015 | GPA: 4.0/4.0

- **Outstanding Honors Student Award** - Named honors student of the year
- **Honors Program**: Two-semester research project on computer malware, extended PareM interpreter, developed unemployment calculation method, demonstrated analog circuits for differential equations
- **Tutoring**: Only tutor for higher-level math (Calculus I, II, III, Differential Equations), taught programming (C++, Visual Basic, Java, MATLAB), provided GED prep
- **Phi Theta Kappa** International Honor Society

TECHNICAL SKILLS

Languages: C++, C, Java, Python, TypeScript, JavaScript, SQL, Go, Swift, Verilog, MATLAB, PHP

AI & ML: Claude Models, AWS Bedrock (Knowledge Bases, Agents, Guardrails), Prompt Engineering, Model Context Protocol, CUDA, cuBLAS

Frontend: React, Angular, Vue.js, Vite, Tailwind CSS, Apollo GraphQL, Android/iOS Development

Backend: Node.js, Spring Boot, Express, GraphQL, REST APIs, Microservices, gRPC, OAuth 2.0, WebSockets

Cloud & DevOps: AWS CDK, Lambda, S3, CloudFront, DynamoDB, EC2, Bedrock, Docker, Kubernetes, CI/CD, Terraform

Databases: PostgreSQL, MySQL, MongoDB, Couchbase, DynamoDB, Redis

Security: BurpSuite, Fortify, Wireshark, End-to-End Encryption, OAuth 2.0, Application Security

Hardware: FPGAs, Verilog, Vivado Design Suite, Arduino, CUDA, Circuit Design, Digital Logic

Specializations: Low-Latency Systems, Distributed Systems, Generative AI Integration, System Architecture, Hardware/Software Co-design, Cache Optimization, Lock-Free Data Structures

PUBLICATIONS & RESEARCH

- **S. A. Seidel et al., "Analysis of Large-Scale Experimental Data from Wireless Networks"** - IEEE INFOCOM 2018 (CNERT Workshop)
- **S. A. Seidel et al., "Separating Interaction Effects using Locating and Detecting Arrays"** - IWOCA 2018, Lecture Notes in Computer Science
- **S. A. Seidel et al., "Robustness of Recovery in Locating Array-based Screening Experiments"** - SpringSim 2019
- **Master's Thesis**: Locating Arrays: Construction, Analysis, and Robustness - Research on wireless network performance optimization

NOTABLE PROJECTS

Byzantine Ison (2015-Present) - Orthodox Christian chanting app with **50,000+ downloads, 4.7/5 rating** on Google Play, only 1 crash reported across entire lifetime. Uses native C++ and OpenSL ES to eliminate buffering delays. Combines cultural preservation with technical skills.

Autonomous Racing Vehicle - **First place** in competitive race where only 3 of all teams finished. Integrated multiple Arduinos, LIDAR sensors, adaptive speed control, and fault-tolerant sensor fusion algorithms working together in real-time.

PareM Interpreted Language (2014) - Custom Lisp-like programming language with unique ability to store, pass, and execute code block references. Built fully working interpreters in Java and Visual Basic. Demonstrates deep understanding of language design and compiler construction.

High-Frequency Trading Parsers (2019) - Built zero-copy C++ parsers for 12 cryptocurrency exchanges with microsecond-latency requirements, cache optimization, and lock-free data structures for HFT infrastructure.

FPGA Audio Recorder (2016) - Hardware/software co-design project implementing audio recording system in Verilog using Vivado Design Suite. Features playback at multiple speeds and volume calculation via audio stream density.

Analog Circuit Differential Equation Solver (2015) - Designed and built analog circuit using capacitors, resistors, and breadboard to physically model and solve differential equations. Graphed solutions using oscilloscope. Honors project showcasing unique problem-solving approach.