Alexander Medeiros

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Summary

I am a Senior Software Engineering Researcher with over a decade of experience. I helped define the foundation of all future hardware products at Capital One, instructed and mentored hundreds of students as they transitioned into the software engineering industry, and contributed to the oversight of several million-dollar projects on the board of directors of the building in which I reside.

Professional Experience

Capital One | Lead Software Engineer | McLean, VA — November 2024 – Present

Tech Stack: Kotlin | Golang | Angular | AWS ECS | Docker | AWS Lambda

- Led six software engineers to develop an internal investigation management application as part of Capital One's anti-money laundering initiatives.

FINRA | Senior Software Engineering Researcher | Rockville, MD — June 2022 – November 2024

Tech Stack: Python | XBRL | Jenkins CI/CD | Docker | AWS Lambda

- Built a data pipeline that ingests all publicly traded companies' financial statements, computes various financial figures such as Net Income or Gross Profit, and publishes those figures for half-a-dozen downstream consumers.
- Financial statements come in all different shapes according to the industry and company. To accurately extract facts and figures, I became intimately familiar with a standard called XBRL and the US Financial Standards Board recommendations.
- Given a six-month deadline I was able to replace our original vendor who *was* the source of this data for over two decades. This saved the company up to $2M.

SoundExchange | Senior Software Engineer | Washington, DC — September 2020 – June 2022

Tech Stack: Java | Spring | Angular | Python | Bash | PostgreSQL | Jenkins CI/CD | Docker | AWS ECS

- Member of the "distribution processing" team which managed royalty distribution from providers such as Spotify to respective artists.
- Implemented an accounting system that ingested billions of rows of data (play data for songs, podcasts, etc) per month and built a mapping of artists to their payout amount.
- Our new accounting platform reduced processing time from several days to several hours. This was accomplished by building on more modern design principles such as append-only storage and highly horizontally scaled infrastructure.

Capital One | Lead Software Engineer | McLean, VA — May 2019 – September 2020

Tech Stack: Node.js | React | Golang | Bash | MySQL | Jenkins CI/CD | Docker | Ubuntu | AWS ECS | AWS Lambda

- Designed and built a prototypical ATM that would serve as the foundation for future hardware products at Capital One.
- Our team was the hub of many spokes where we integrated work from various teams across hardware, identity & account management, security (both physical & virtual), and money movement. We weaved together the various efforts with hardware drivers, backend APIs, and our frontend webapp.
- I was personally responsible for scheduling meetings with the majority of technical resources including preparation of architecture & sequence diagrams, defense of our security model, and interfacing with money movement.
- Our prototypical Cashier's Check Kiosk was deployed into a Capital One location just before the COVID-19 pandemic. The pandemic resulted in a re-org where I was pulled onto our sister team as their tech lead.

FINRA | Mid-Senior Software Engineer | Rockville, MD — May 2018 – May 2019

Tech Stack: Java | AWS StepFunction | AWS Lambda | Bash | Jenkins CI/CD

- Isolated and migrated a batch job from a soon-to-be deprecated on-prem system into AWS.
- The old job was written across a two thousand line SQL script and three bash scripts which I teased into a set of organized SQL functions and a more reasonable Java program.
- Had this system not been migrated, FINRA would be in violation of its contract with the SEC.

Johns Hopkins University: Applied Physics Lab | Junior Researcher | Laurel, MD — September 2013 - May 2018

Tech Stack: Java | Angular | Android | Kafka | Zookeeper | PostgreSQL | SQLite | MATLAB | GitLab CI/CD

- Developed some of the first mobile apps at APL for customers including the US Navy and US Border Patrol.
- Labeled and trained ML models to classify features across many terabytes of satellite imagery.
- Built Google Earth plugins to interactively visualize submarine routes.
- Across my five years at JHU: APL, I jointly developed over half-a-dozen projects, with the majority securing next-round funding, awarded for their effectiveness in solving their respective problems.

Other Relevant Experience

Tower Villas Council of Co-Owners | Secretary of Board of Directors | Arlington, VA January 2022 – January 2025

- Elected by the residents into the Tower Villas (~260-unit condo building) Board of Directors to advise and decide on critical matters to the building and community at large.
- Every month the board meets to rule on motions brought forth by committees such as Building & Grounds, Finance, Social, and Technology.
- Our cohort solved issues of varying scale. From one of potentially catastrophic proportions, a bow in the foundational concrete slabs of the building; to issues as seemingly trivial as what color to use for the trim of the hallways.

George Washington University | Software Engineering Instructor | Washington, DC November 2021 – May 2022

Tech Stack: Node.js | Javascript | React | MySQL | MongoDB

- Taught a 24-week software engineering bootcamp where my students started with zero experience. The goal was to have them ready for industry by the end of their class. I'm excited to say there were no dropouts, all my students passed, and about half of them found software engineering jobs! Following is the feedback I received as an instructor:
  - "Alex, Sebastian, and Ethan went above and beyond to help us with our group projects and even took their own unpaid time to make sure we were able to complete our assignments. Amazing instructors"
  - "I really can't thank you enough for everything you've done for us all throughout the class. Being able to see the passion you exude while teaching is a huge reason as to why I've fallen in love with this thing that I knew nothing about 6 months ago, and I am so grateful for that. Thank you again for everything…"
- Nominated for Best Instructor of the Year

Project Del Inc | Startup Founder & Full-stack IoT Software Engineer | Leesburg, VA May 2017 – May 2018

Tech Stack: Raspberry-Pi | C | Java | Typescript | CAD (Fusion 360) | Android | Angular | Firebase

- Project Del's mission was to automate the mundane to create more time for those we love. It all started at the metaphorical beginning of our day, with a cup of coffee.
- Developed a prototype smart coffee maker that automated the coffee-making process for 1-2 weeks with little human intervention.
  - Users had the ability to finely adjust all coffee-making parameters including water temperature and coffee ground size. Made possible by designing and implementing an array of electronic sensors such as digital thermometers.
- Led our team through 3D modeling, embedded/application development, and external relationships until we ultimately dissolved under time constraints.

Ezra Media Studios | Lead Software Engineer | New York, NY March 2018 - August 2018

Tech Stack: Arduino | Hand-built circuits | Integrated Circuits (IC)s | C/C++ | Twitch Streaming Platform

- Created remote-controllable "episodes" that launched every Friday at 3 pm for audiences of hundreds of live viewers to engage with a story-driven computer learning experience.
- Using Arduino hobbyist circuit boards, robotic hands, LED grids, etc. My team enabled Twitch viewers (our audience) to remotely interact with real-life electronics using commands sent in the platform's chat feature.
- Led our tech team in designing the communications interface between the hardware and software. Additionally, I wrote all the hardware drivers used in each week's episode.

Human-Computer Interaction Lab | Machine Learning Researcher | College Park, MD June 2016 - January 2017

Tech Stack: Arduino | C/C++ | Caffe Deep Learning Framework | MATLAB

- Studied the use of a finger-mounted camera to aid hard-of-sight individuals in determining clothing patterns.
- Built a real-time image classifier using the Caffe Deep Learning Framework to design, train, and test a neural network that classified our set of ~30 pieces of clothing across 12 different styles with 97% accuracy.
- Modeled and 3D printed a finger-mount for a micro camera which was used as the data source for the classifier.
- My work was accepted as a poster submission for the ASSETS conference.

Hands-on Skills

- **Languages:** Python | Java | C | Typescript | Javascript | Bash | SQL | C# | HTML | CSS
- **Frameworks (Backend & Frontend):** Spring | Express.js | React | Android | Angular | AngularJS | Unity3D
- **Build Systems:** Jenkins CI/CD | Maven | NPM | Gradle | Pipenv | PDM
- **Operating Systems:** Linux | macOS | Android | Windows
- **Infrastructure:** AWS (Lambda, RDS, StepFunction, DynamoDB, S3, ECS, EC2)
- **Hardware:** Arduino | Raspberry-Pi | Hand-built circuits | Integrated Circuits (IC)s

Education | Qualifications

- PhD 2037 (In-progress) Computer Science | University of Maryland, College Park | Investigating workplace culture formation
- MS 2027 (In-progress) Computer Science | University of Maryland, College Park
  - CMSC734 Information Visualization: visualize data structures and the human computer interaction of data exploration.
  - CMSC451 Design and Analysis of Computer Algorithms: explore graph, dynamic programming, greedy, approximation, and network flow algorithms.
- BS 2017 Physics and Computer Science | University of Maryland, College Park
- Patents

    - Monitoring of Interactions Using Eye Tracking (US20220308665A1)
    - Multi-boot architecture for electronic interaction device (US20220308891A1)
    - Methods and Systems for Conducting an Electronic Competition (US20220383294A1)
    - Systems and methods for securely generating and printing a document (US11797974B2)
- AWS Associate Architect Cert
- AWS Workshop Instructor (taught AWS at Capital One)