

ALEXANDER MA

Software Development | Cloud Solutions Architect

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ABOUT ME

Candidate for Master's at University of Oxford, 2019

Pursuing MSc in Social Science of the Internet at the [OII](#)

(Completed) Bachelor of Science in Engineering in Computer Science +

Bachelor of Arts in Philosophy at University of Pennsylvania, 2018

Courses: Networked Systems, Operating Systems, Computer Security, Compilers, Crowd-sourcing and Human Computation

My long term personal agenda is to democratize technology- to harness the power of connectivity that the digital age has brought to address social issues, providing users with new opportunities and freedom. With a background in biology, computer science, and philosophy, I have the technological skills to bring rapid development of solutions to professors and companies, as well as the analytical and communication skills to think of and convey new ideas to people I work with. Check out my portfolio below! I am always willing to learn new technologies.

To date, I have:

- Fundamentally **changed the product** of healthcare startup Keriton from a hardware solution to a software solution, significantly reducing expenses.
- Disrupted the US exports industry by countering markup from distributors through a crowd-sourcing app that has won the **Most Entrepreneurial Hack at PennApps**, and the solution was bought by a company!

- Worked on cutting edge technologies with professors that deal with large scale problems in **NLP** and **computer networks**.
- Came **2nd Runner Up** at Hong Kong's FinHACK 2018 hackathon with a **fintech solution** that makes terms & conditions frictionless for insurance.

Check out my CV [here](#).

EXPERIENCES

Ruffer LLP

2019 - 2020

Software Developer

- Created an NLP tool in Python to analyze 10,000s of 10-K reports for stockanalysts. Defined features in weekly meetings with users using prototypes.
- Built a predictive risk pipeline for the Chief Investment Officer that simulates large redemption events and identifies illiquid holdings, automating a weekly process that typically takes hours. Results are sent to clients as per regulation.
- Doubled the capacity of our cloud data science service and made it highly available by configuring Azure Kubernetes Service and Terraform.
- Initiated and led a company-wide hackathon and assembled cross-functional teams that resulted in eight working solutions to optimize business processes. Some of these results have been productionized.

Libryo

2019

Data Visualization Intern

- Implemented and maintained R Shiny dashboards through the inclusion of graphs that display time series financial and user activities data.
- Developed data pipelines to move data from MySQL databases into R Shiny dashboards and Excel sheets.
- Created visual mock-ups of a new dashboard displaying Libryo Turk activity, translating business needs into products used by Libryo staff and Turks.

Smart Cities Expo World Congress

2017

Data & Technology Reporter

- Wrote summaries and notes for the Data & Technology Topic for the 142-page official report covering the event, which attracted 700+ cities and 18,000+ attendees.
- Attended keynote speeches over the course of the entire event, as well as interviewed key players from cities' Chief Innovation Officers to CEOs of tech companies exhibiting their products in the conference space.
- See the report [here](#).

Okta, Inc.

2017

Mobile Developer Intern

Keriton (Healthcare Startup)

2016 - 2017

University of Pennsylvania

2016

PPDB: The Paraphrase Database

2015 - 2016

The Chinese University of Hong Kong

2013

- I worked with the Mobile and UX teams to enhance Okta's enterprise mobile application by implementing fingerprint verification, streamlining the login flow by handling new API tokens securely. I updated UI features by adding a new customizable keypad to replace the native keyboard, and slide-in error message and other animations. These features were all shown in Okta's annual conference at the end of my internship. I wrote all the unit tests through mockito to ensure maintainability. This was all done in Java.
- The Okta Mobile app is used by millions of users daily for Single-Sign On as part of Okta's secure access management service.
- See my contributions being shown [here](#) at an Oktane keynote!

Full Stack Developer

- From scratch, I developed and deployed the first Keriton hybrid app in 3 months, which tracks a mother's milk output as well as providing nurses a means to manage their bottles. The app can scan barcodes on bottles, and has a video chat feature through the use of Twilio. I used the Ionic framework built on cordova and integrated push notification service for both iOS and Android with APN and GCM. I added Crashlytics for crash analytics.
- I also developed the entire backend with REST API for the app using Node.js, and deployed the server to an Amazon AWS instance. I designed and set up the PostgreSQL database with FHIR standards, which holds the patient and bottle data.

Rust Language Programming Instructor

NLP Research Assistant

- I developed a web scraping program in Python to go through Thesaurus.com and gather paraphrases for my professor's database. This would then be used as a gold standard to test my professor's word clustering algorithm.
- I created a digraph-based representation of the database using Java to implement Tarjan's algorithm and JavaScript to visualize the data. These would be used to detect undesirable entailment cycles within the database and be used to improve the database further.

Genetics Research Assistant

- Conducted molecular characterization of TDG gene in the male germ cell using such techniques as PCR
- Results were to be used to identify novel epigenetic regulation in male germline stem cell development

COMPETENCIES

Languages	Java, JavaScript, C, Rust, Python, HTML/CSS, SQL, Ruby, Solidity
Dev Tools	GitHub, JIRA, Android Studio, Docker, Proto.io
Frameworks/Environments	AngularJS, Node.js, React.js, Ionic, Ruby on Rails

PORTFOLIO

Ethereum DApp: Supply Chain Error Propagation ([github](#), [ipfs-interface](#))

- A decentralized application containing a smart contract written in **Solidity** in a **Truffle** environment, and a **React.js/Web3.js** front-end that allows companies to propagate error reports down their supply chain.
- Written with best practices by Consensus and avoids common attacks.
- As a proof-of-concept, I wrote a small application that allows one to upload files to **IPFS** through an **Infura** node, and put this up on **Docker**.

Web Application: Quizmas

- Hackathon project for FinHacks 2018
- A quiz application created with **React** on a **Node.js/Express + MySQL** server that appears on Terms & Conditions pages to help customers better understand products they wish to purchase, as well as the sales teams of companies to improve sales strategy based on metrics taken from the quiz
- A dashboard hosted on a **PHP server** that allows sales teams to deploy new quizzes and receive insights on data retrieved from quizzes

Mesh Networks: MaESHtro (cannot release publicly)

- A solution that combines **mesh networks**, **software defined networking**, and **routing** to boost Internet connectivity in areas using existing IoT infrastructure.

Processor Design: RISC-style Processor (cannot release publicly)

- Final project for Computer Organization and Design class
- An implementation of a **superscalar multi-pipelined processor** in **Verilog** that is fully bypassed with branch prediction and logic that eliminates superscalar and structural hazards.

Operating System: PennOS (cannot release publicly)

- Final project for Operating Systems class
- An implementation of an **operating system** in **C**, with process life-cycles, priority scheduling, signaling, and a shell that separates the kernel and user-level.

Web Application: Trade-o-bundle ([github](#), [devpost](#))

- Hackathon project for PennApps
- A set of **responsive web pages** for suppliers, distributors and small mom-n-pop shops have been set up to automate the entire flow of information as export/import orders are processed and fulfilled.
- An intuitive "pool purchasing" option allows smaller retail stores to directly place order with international suppliers, totally bypassing the markups of the local distributors.
- Finally, **analytics** on order data provide insights into the purchasing behavior of the end-customers. This allowed us to anticipate demand and pre-stock international ports.

Ruby on Rails Website: Partner Basic ([github](#))

- An app created with the **Ruby on Rails** framework and a **PostgreSQL** database, which links employers with student groups.
- Uses the gems: Better Errors, RSpec, HAML, Bcrypt

JavaScript Tool: Network Visualization Tool ([github](#))

- A visualization tool developed for a professor using sigma.js that takes in data on switches and links to monitor data centre networks in high resolution.

Python Tool: Thesaurus.com Crawler ([github](#))

- A **web crawler** that uses the scrapy module to grab synonyms from thesaurus.com.

Java Tools: Graphing-based Data Analytic Tools ([cycles](#), [exclusion](#))

- A tool that detects undesirable entailment cycles in paraphrase databases by creating a **digraph-based representation** of the data. Implements Tarjan's algorithm for cycle detection.
- A tool that can make new inferences on exclusion relations in paraphrase databases by creating a **digraph-based representation** of the data.

Full Stack Solution: Kare Mom App (cannot release publicly)

- A **full stack solution** that allows mothers to track their milk production and automates the milk management system used by nurses at a NICU.
- The client facing hybrid app uses **Angular** and **ionic** and includes a **barcode scanner**, Twilio **video chat** integration, and APN/GCM **push services**. In the background, **crash analytics** are collected through Crashlytics.
- I also implemented a **REST API** for the app using **Node.js** to write a server deployed on an **Amazon AWS** instance, with a **PostgreSQL** database that conforms to FHIR standards.

Android Application: OktaMobile Fingerprint Auth (cannot release publicly)

- Used the Android Fingerprint API to implement **fingerprint authentication** in the OktaMobile app.
- Enhanced the login flow user experience by adding **UI** features like a customizable keypad and animations in **XML** and **Java**.
- Created unit tests using the **Mockito** framework.

Artificial Intelligence: Q-learning in Java + Flappy Bird ([github](#))

- An implementation of **Q-learning** in **Java** that takes in (x, y)-coordinates of the pipes and flappy bird and, after many attempts, learns when to make the bird flap to proceed through the level.

Artificial Intelligence: Q-learning in Rust + dungeon crawler ([github](#))

- An implementation of **Q-learning** in **Rust** that takes in a static dungeon and, after many attempts, learns how to traverse through the dungeon's traps and defeat the final boss!

Java Program: Chess Implementation with GUI (cannot release publicly)

- A school project that helped me learn concepts like **data structures**, **enumerations**, **Java Swing**.
- An implementation of chess where two players may play each other in a **GUI**

Go Proxy: Simple HTTP Proxy (cannot release publicly)

- Implemented a simple web proxy in Go that passes requests between requests and data between multiple web clients and web servers.
- Supports concurrent connections, and optimized with DNS prefetching
- Compatible with Firefox