ANDREW THOMAS

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Andrew is a software engineer and former Computer Science and Engineering student at Northwestern University. He has significant experience building cloud applications at every layer of the stack and working on driven, high-velocity teams.

SKILLS

- **Programming languages**: TypeScript, JavaScript, Java, Go (Golang), C++, Dart, Python, Racket, SQL
- **Web**: React, Svelte, MobX, RxJS, Redux, Google Maps, mapbox, deck.gl, React-vis, styled-components, LESS
- **Mobile**: Flutter, React Native, Adobe PhoneGap
- **Server**: Gin, Node.js, Express, gqlgen, GraphQL Java
- **Authn/authz**: bcrypt, OAuth 2.0, JWT, Auth0, AWS Cognito, RBAC, ACL, Casbin
- **Network**: HTTP, WebSocket, JSON, Protocol Buffers, GraphQL, MQTT, RabbitMQ, RPC
- **Storage**: MySQL, PostgreSQL, PostGIS, Redis, Firebase
- **Tools**: webpack, npm, bash, git, Babel, Docker, Figma
- **AWS**: EC2, Lambda, S3, RDS, Cognito, ECR, API Gateway
- **Testing**: Jest, Mocha, Storybook, JUnit, Cucumber
- **Robotics**: OpenCV, path planning, motion profiling, localization, feedback loops

PROFESSIONAL EXPERIENCE

The Toro Company *(by acquisition)* **March 2021-Current** *Specialist I*

- Researched and implemented authentication, authorization, and accounting (AAA) system to provide single sign-on (SSO) and consolidate AAA among company applications using Go, Java, AWS Cognito, OAuth 2.0, Casbin, and Redis.
- Built MVP data ingestion and visualization application; coordinated with hardware team and customer to validate.
- Developed web boilerplate and common packages using React, RxJS, MUI, Vite, Jest, Testing Library, and Storybook.

Left Hand Robotics *(startup)* **August 2020-March 2021** *Software Engineer*

- Built single-page application to ingest and visualize streams of sensor data, including interactive visualization builder interfaces for spatial-temporal data using React, deck.gl, React-vis, styled-components, mapbox, and RxJS.
- Developed API microservices to manage and query enriched sensor data using Go, Auth0, PostgreSQL, and PostGIS.
- Built end-to-end pipeline to stream robot camera feeds to a dashboard with AWS Kinesis Video, GStreamer, and C++.

CBOE Global Markets **June 2020-August 2020** *Software Engineer Summer Intern*

- Coordinated with research team to learn methodology of Cboe S&P 500 Covered Combo (CMBO) Index.
- Implemented daily and roll day calculation for CMBO using Java, Apache Kafka, Hazelcast, and internal frameworks.
- Developed unit tests (JUnit) to verify calculation correctness and behavior tests (Cucumber) to verify integration.

Left Hand Robotics *(startup)* **June 2019-September 2019** *Software Developer, Intern*

- Developed storage mechanism, API, models, and data migration tooling for enhanced object storage and mutation system to solve major server and network bottleneck using Google Protocol Buffers and Java.
- Built client-side library for reactive consumption, in-place mutation, and upload of Google Protocol Buffer objects.
- Redeveloped GPS path editing tools to compute mutations on client using React, MobX, Turf.js, and Google Maps API.

June 2018-September 2018

- Redesigned two primary frontends to meet new customer needs and integrate the Ant Design framework for React.
- Researched area coverage and cell decomposition techniques and built POC planning algorithm using Go and Python.
- Developed complex GPS path editing web interface and server API for persistence and advanced geometric mutation.
- Created robot monitoring page to remotely control robots and visualize real-time status and geospatial data using React, TypeScript, MQTT over WebSocket, Google Maps API, and MobX.

May 2017-March 2018

- Built complex robot operations center web application for managing inventory, collecting GPS path data, robot tasks, and reports, for customer and internal support usage, utilizing TypeScript, React, MobX, LESS, and webpack.
- Developed registration, token-based authentication, and RBAC authorization systems using Java, bcrypt, and JWT.
- Implemented internal message consumption and routing system on top of RabbitMQ using custom message protocol for HTTP and WebSocket requests to automate communication between microservices using Java and Grizzly NIO.
- Built API for fetching object model descriptors, object data, and links between objects using the Java Reflection API.

Workday **Summer 2015, Summer 2016** *GW Software Engineering Intern*

EDUCATION

Northwestern University *(incomplete)* **Sept 2017-June 2020**

- **Major**: Computer Science, B.S. (GPA: 3.4), **School**: Robert R. McCormick School of Engineering, **Status**: 38/48 credits
- **Courses**: Data Structures, Algorithms, Computer Systems, Computer Networking, Programming Languages, Artificial Intelligence, Machine Learning, Scalable Software Architectures, Cyber-Physical Systems

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EXTRACURRICULAR

FRC 1619 Up-A-Creek Robotics **August 2020-Current** *App Software Mentor*

https://www.team1619.org – a high school FIRST Robotics Competition team.

- Mentor the app software team, responsible for developing web and mobile applications for data collection and analysis at robotics events. Teach high school students basic development skills like git and bash as well as full stack development using React, React Native, and Node.js.

EPIC (Northwestern club) **September 2017-June 2018** *Tech Team Co-director*

https://epicnorthwestern.com - Northwestern's undergraduate entrepreneurship club.

- Co-directed Tech team: ran team meetings, taught software development technologies including React, Node.js, pugjs, and Flask, and oversaw and provided mentorship for student projects.
- Led .io, a program that aimed to provide students an experience comparable to that of working in a software-oriented startup while in a forgiving environment with an emphasis on learning (*https://andrewt.io/.io*).

FRC 1619 Up-A-Creek Robotics **January 2014-September 2017** *Software Lead*

https://www.team1619.org – a high school FIRST Robotics Competition team.

- Led development of software for several competition robots, developing effective teleoperation controls and complex autonomous routines (*https://github.com/Team1619*).
- Taught students of various skill levels Java programming, basic control theory, path planning algorithms, trajectory generation for motion profiling, computer vision, and object-oriented design including S.O.L.I.D. principles.
- Taught Java programming, web development, and computer security to middle schoolers in team summer camps.

PROJECTS

- **News search engine**: a simple news search engine using articles scraped from the Common Crawl project datasets, utilizing Amazon EC2, AWS Lambda, Amazon SQS, Elasticsearch, and Tomcat. *Source not publicly available due to academic restriction*
- **MASM video game**: a video game inspired by Overcooked programmed in 32-bit Microsoft assembler using the MASM32 SDK. *Source not publicly available due to academic restriction*
- **Racket visualizer**: a web application that parses Racket/Lisp code and renders a tree visualization.
    - *https://andrewt.io/racket-visualizer*
    - *https://github.com/andrewmthomas87/racket-visualizer*
- **FRC clock**: a web application that displays a clock and information about the FIRST Robotics Competition team corresponding to the current time using data from The Blue Alliance API.
    - *https://andrewt.io/frc-clock, https://andrewt.io/frc-clock?team=1619*
    - *https://github.com/andrewmthomas87/frc-clock*
- **rx-bloc**: a TypeScript/JavaScript state management library using RxJS, based on the Business Logic Component (BLoC) Pattern designed by Paolo Soares and Cong Hui for Flutter and an accompanying TodoMVC implementation.
    - *https://github.com/andrewmthomas87/rx-bloc*
    - *https://github.com/andrewmthomas87/rx-bloc-todomvc*

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