

Andrew Thomas

<https://github.com/andrewmthomas87> • <https://andrewt.io>

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

EDUCATION

Northwestern University (*incomplete*)

Sept 2017-June 2020

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

SKILLS

- **Programming languages:** TypeScript, JavaScript, Java, Go (Golang), C++, Dart, Python, Racket, SQL
- **Web:** React, Vue.js, MobX, RxJS, Redux, InversifyJS, Google Maps API, deck.gl, HTML, CSS, 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, Redis, Hazelcast, Firebase
- **Tools:** webpack, npm, bash, git, Babel, Docker, Gradle
- **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

Toro (by acquisition) Left Hand Robotics

March 2021-Current
August 2020-March 2021

*Specialist I
Software Developer, Intern*

CBOE Global Markets

June 2020-July 2020

Software Engineer Summer Intern

- Integrated with team developing platform for calculating stock market indices using real-time market data.
- Coordinated with research team to understand 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 to verify implementation correctness and behavior tests to verify system 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.
- Redesigned and redeveloped GPS path editing tools to compute mutations on client, integrate new protocol buffer object system, and meet new customer needs utilizing Typescript, React, and the Google Maps API.
- Researched message brokers for publish-subscribe and remote procedure call communications between robots, mobile and web clients, and servers and per-message authorization techniques to enhance system security.

June 2018-September 2018

- Redesigned two primary frontends to meet new customer needs and integrate the Ant Design framework for React.
- Developed common npm package to share service and component code between frontend applications.
- Researched area coverage and cell decomposition techniques and implemented PoC coverage planning algorithm.
- Developed complex GPS path editing web interface and server API for persistence and advanced geometric mutation.
- Created robot monitoring page to visualize real-time robot status and progress data along programmed paths.

May 2017-March 2018

- Built robot operations center web application for managing inventory, collected 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 role-based access control (RBAC) authorization systems.
- 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.
- Discussed and researched robot path planning and control algorithms with team members.
- Built web application for path collection hardware using real-time sensor data from embedded Python server.
- Evaluated potential candidates for hire, performed technical interviews, and onboarded junior frontend developer.
- Built API for fetching object model descriptors, object data, and links between objects using the Java Reflection API.
- Developed application for viewing and mutating data in server object system for use by developers and support staff.

Workday

Summer 2015, Summer 2016

GW Software Engineering Intern

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; held 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-sponsored 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*
- **Northwestern academic planner:** a mobile app for iOS and Android to facilitate finding and scheduling courses using course data provided by a university API built using Flutter, GraphQL, and a Golang server.
 - https://github.com/andrewmthomas87/nu_classes_mobile
 - https://github.com/andrewmthomas87/nu_classes_server
- **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>