# ZACKARY CROSLEY

MICHIGAN    |    MAIL@CROSLEYZACK.COM    |    CROSLEYZACK.COM

## EDUCATION

### MASTER'S OF SCIENCE
Computer Science  ·  Arizona State University  ·  GPA 3.80  ·  Aug 2019

### BACHELOR'S OF SCIENCE
Computer Science  ·  Arizona State University  ·  GPA 3.76 (Magna Cum Laude)  ·  Dec 2017

## EXPERIENCE

### SOFTWARE ENGINEER II
Engineering  ·  Censys Inc  ·  Jun 2022 – Present

- Served on Risks team developing APIs and pipelines for Exposure Management product.
- Developed diagrams, documentation, CI/CD, protocols, and kubernetes configs for APIs/microservices.
- Maintained applications with updated features, improved testing, bug fixes, and better abstractions.
- Created gRPC Gateway to interface between Censys and Workato to manage third party integrations.
- Built Risk Type service to poll various services for changes and update Postgres risk datastore.
- Designed and developed pipeline for CVE Risks pulling NVD and host data over gRPC, generating risk definition, posting annotations over Pub/Sub, and storing into Google Spanner.
- Developed efficient and hierachical user configurations in Google Spanner using interleaved tables.
- Researched new vulnerabilities and produced fingerprints to identify vulnerable systems in Censys data.
- Developed procedure for fingeprinting risks that reduced code repetition and improved performance. Used this methodology to quickly add dozens of fingerprints in response to vulnerability announcement.
- Created library of shared code within risks improving code quality and removing thousands of lines.
- Worked with product and marketing to describe features and highlight implications to customers.

### OPERATIONS RESEARCH ANALYST GS-12
The Research and Analysis Center  ·  Army Futures Command  ·  May 2017 – May 2022

- Served as developer on a Combined Arms Analysis Tool for the 21st Century (COMBATXXI), a stochastic (Monte Carlo), high resolution, closed-form, discrete event combat simulation.
- Developed a navigation suite in Python to aid in rapid implementation of maneuver behaviors. Library estimated to save hundreds of man hours of scenario development per scenario.
  - Created a graph data structure loaded from terrain, storing contextual data (trafficability, node or edge type) for nodes and edges to facilitate intelligent searching and knowledge representation.
  - Optimized graph via functional programming approach with memoization and lazy evaluation.
  - Implemented search methods and path manipulation algorithms to produce unit maneuvers.
- Developed Utility AI framework in Java to define utility decisions for autonomous agent behaviors.
- Developed Python script to parse wargaming tool output and generate scenario behaviors automatically.
- Developed Java terrain reasoning methodology as sequential discrete sampling and utility evaluation.
  - Utilized Terrain Reasoning to develop advanced behaviors, such as an automated tank defilade.
- Led model development for an analysis alternative study. Identified required model enhancements and model behaviors and coordinated with integration team on scenario implementation.
- Received Honor Graduate recognition in Operations Research Military Appications Course.

## STUDENT RESEARCHER

Security Engineering for Future Computing Lab · Arizona State University · Jul 2017 – Aug 2019

- Worked with Professor Adam Doupé applying inductive programming to software security.
- Worked with members of SEFCOM lab to generalize inductive programming technique presented in paper by Sumit Gulwani (Microsoft). Methodology uses Directed Acyclic Graph intersection to isolate operations that could result in individual characters of output.
- Created novel technique of synthesizing exploits in Capture the Flag (CTF) scenarios by sniffing traffic, categorizing exploits, learning exploit logic using inductive programming, and attacking other players with synthesized exploits.
- Documented research in thesis and presentation at Arizona State University. Research is ongoing and pending publication.

## COMPUTER SCIENCE INTERN

High Performance Computing Directorate · Patuxent River Naval Air Station · Jun 2015 – Aug 2016

- Worked at High Performance Computing division on project using machine learning to evaluate existing aircraft Tactics, Techniques, and Procedures (TTPs) and identify superior TTPs.
- Implemented and tested evolutionary algorithms for learning TTPs. Validated algorithm results with Subject Matter Experts on real-world scenarios with modern aircraft data.
- Worked with team to perform IT and maintenance on Windows High Performance Computer (HPC).

## PUBLICATIONS

### AUTOMATED REFLECTION OF CTF HOSTILE EXPLOITS (ARCHES)

Master's Thesis · Arizona State Univeristy · 2019

### MINING ASSOCIATIONS IN LARGE GRAPHS FOR DYNAMICALLY INCREMENTED MARKED NODES

International Conference on Machine Learning and Data Mining in Pattern Recognition · 2018

## PROFICIENCIES

| | | | | |
|---|---|---|---|---|
| Golang | Julia | Neo4j | Numpy | GCP |
| Python | TypeScript | Prometheus | Scipy | Pub/Sub |
| Java | SQL | Protobuf | Kubernetes | Linux |
| C++ | Spanner | gRPC | Docker | Bash |
| Clojure | Postgres | Pandas | Git | Vim |

## HONORS AND ACTIVITIES

Operations Research Military Applications Course Honor Graduate · 2020
Science Mathematics and Research for Transformation Scholarship · 2016 · 2018
ASU Hacking Club Member · 2018 – 2019
FIRST Robotics Team Mentor · 2017 – 2019

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