# ZACKARY CROSLEY

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## 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 Censys Risks team developing features for Attack Surface Management (ASM) product.
- Developed Golang microservice to pull data from various data sources, load a Spanner database, and provide indexed data over gRPC.
- Defined Protocol Buffers, Gitlab CI/CD pipelines and Kubernetes configuration for microservices.
- Worked on microservice to collect CVE exploit data from various sources for added CVE context.
- Developed architectural diagrams, documentation, and interfaces for new microservices.
- Researched new vulnerabilities and produced fingerprints to identify vulnerable systems in Censys data.
- Developed methodology for fingerprinting risks that reduced code repetition and improved performance. Used this methodology to quickly add dozens of fingerprints in response to vulnerability announcement.
- Built systems to contextual risk data like detect version information and present it in UI to customers.
- 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. Script uses maneuver defined in planning meetings to create scenario maneuver, rather than copying manually.
- 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 on regression analysis, probability, statistics, mathematical programming, data visualization, and data analysis.

### 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 from samples in Capture the Flag (CTF) scenarios.
- Application sniffed network traffic using Scapy and categorized exploits, learned logic of exploit scripts from traffic using inductive programming, and attacked players with synthesized exploit.
- Developed Docker test suite to validate and demonstrate successful replication of exploit script logic.
- 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).
- Performed system updates, replaced faulty HPC components, and developed remote job submission program in Microsoft Powershell.

## 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 | Scipy | GCP |
| Python | TypeScript | Prometheus | Kubernetes | Pub/Sub |
| Java | SQL | gRPC | Docker | Linux |
| C++ | Spanner | Pandas | Git | Bash |
| Clojure | Postgres | Numpy | Make | 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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