Ari S. Li

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Game Development and Software Development

Mercenary Technology: Junior Software Engineer Fremont, CA
Tech: TypeScript, C#, Unity **Platforms**: Meta Horizon Worlds, Meta Quest VR Headsets Jun. 2022 – Jan. 2025

- ***Robot Raiders***: shipped Jan. 2025
  - Collision 3D Math and Systems for Ranged and Melee Combat
    - Modeled players, enemies, and the environment using sphere, capsule, and box colliders in 3D space
    - Wrote raycast and volume intersection code and a collision event interface
    - Profiled performance and optimized code to make responsive combat using limited tools
    - Documented detailed instructions for designers on how to use collision systems
  - Animation Tracker Unity Plugin in C# supporting Enemy AI Behavior
    - Supported animators and AI engineers to implement animation-driven combat behaviors
    - Processed and simplified bone hierarchy using Unity Engine Scripting API using 3D math: quaternions, vector spaces
    - Exported bone hierarchy in Unity animation frames as JSON data and read with TypeScript
    - Attached colliders and metadata to exported bone hierarchy during game runtime
  - Code for Core Action RPG Mechanics
    - Implemented player class abilities: Grenadier, Engineer, and Scout using the Entity Component System (ECS) pattern
    - Programmed enemy weapon and cosmetic attachments that use mesh swapping to create over 20 enemy variations out of six base meshes and animation sets
    - Programmed player weapon attachments with customizable weapon visuals and stats for 14 weapons
    - Tune mechanics to designers' specifications and optimize for player feel
- ***Geometry Gunner***: shipped Jan. 2023
  - Gameplay Programming
    - Rapidly prototyped and iterated upon game mechanics including lobby behavior, combat, and player progression
    - Worked closely with artists to create dynamic 3D background
    - Owned and maintained gameplay code and tuned mechanics to make them intuitive

Godot Prototype: Typing Game
Tech: Godot, C# Nov. 2025 – current

- First-person 3D Dungeon Crawler Typing Game
  - Parsed and indexed large English word list using in-memory SQLite3 database
  - Graded words by complexity to fine-tune gameplay difficulty
  - Designed dungeon crawler gameplay inspired by 80's roguelikes but with typing

Exploration Tracker Mod for Caves of Qud
Tech: Unity, C# Jan. 2022 – Jun. 2022

- Implemented a minimap-like interface for easier navigation
  - Cached each zone's terrain and features as the player explores
  - Under hiatus due to re-evaluation of mod design goals

Cyber Security

Sandia National Laboratories: R&D Cyber Security Analyst Albuquerque, NM
Tech: C++, C, Python, ARM assembly, Embedded Systems Jul. 2019 – Feb. 2021

- Computer Architecture Modeling
  - Replicated instruction timing of ARM SOCs in gem5 simulator pipeline

  - Implemented real-world ARM architecture in gem5 code using C++: caches, branch predictor, prefetching
  - Ran bare-metal C programs on an embedded ARM SOC and compared program execution with gem5
  - Wrote and debugged bare-metal C programs on ARM SOC using JTAG debugger
- Side-Channel Attack Experimentation and Data Analysis
  - Set up side-channel attack experiment on FPGA board in laboratory using sensors, Arduino
  - Modified implementation of I2C protocol on FPGA board using VHDL
  - Automated side-channel attack data collection using Python and AVR C
  - Trained a machine learning classifier on the data using numpy, scipy, matplotlib, scikit-learn

University of Illinois at Urbana-Champaign: Cyber Defense Competitions 2017, 2018

Tech: Metasploit, Splunk, pfsense, other incident response and monitoring tools

- Competed as students in the Argonne National Laboratories *CyberForce Competition* and the *National Collegiate Cyber Defense Competition*
  - Defended a network with various Windows and Linux servers (web, email, Active Directory, DNS, industrial control systems) from attacks
  - Detected and respond to network intrusions during the competition
  - Hardened networks to prevent intrusion by patching vulnerabilities, monitoring network traffic
  - Monitored network incidents using pfsense firewall and Splunk
  - Tested servers for vulnerabilities using Metasploit and conducted vulnerability research using CVE database

Skills

- **Programming languages:** Python, C, C++, C#, GDScript, JavaScript, TypeScript, x86 assembly, ARM assembly, Verilog, VHDL
- **Proficiencies:** Game Programming; Game Development; Gameplay Programming; Software Development; Software Engineering; Software Programming; Debugging; Engine Programming; Engine Development; Performance; Networking; Cyber Security; Low-level Programming; Embedded Systems; Operating Systems; Computer Architecture; Object-oriented Programming; FPGA; Algorithms; Technical Writing; Documentation Writing; Creative Writing
- **Game Development:** Unity, Godot, ECS, gameplay programming, collision systems, physics systems
- **Mathematics:** Linear algebra, 2D Math, 3D Math, Vector Math, Quaternions, Probability Theory, Statistics
- **Tools:** Windows, Linux, shell scripting, KVM, git, Perforce, source control, Jira, Confluence, Microsoft Office, LaTeX

Education

Masters of Engineering (M.Eng.) in Electrical and Computer Engineering 2018 –2019
University of Illinois at Urbana-Champaign Champaign-Urbana, IL

Bachelors of Science (B.S.) in Computer Engineering 2014 –2018
University of Illinois at Urbana-Champaign Champaign-Urbana, IL

Classes: Computer Organization and Design; Advanced Computer Architecture; Digital Forensics I, II; Applied Cryptography; Computer Security I, II; Advanced Computer Security; Communication Networks; Computer Systems Programming; Advanced Operating Systems; Principles of Technical Communication; Ethics and Engineering