

# Ronghan Che

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## EDUCATION

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**M.S. in Computer Science** *Dec 2024*  
Worcester Polytechnic Institute  
**B.S in Computer Science** *Dec 2021*  
**Minor in Mathematics**  
Virginia Tech

## SKILLS

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- High-Performance Computing (HPC), Parallel Computing, CUDA, Compiler Construction, Operating Systems, Assembly Language, C++, C, Python, Bash, PyTorch, Deep Learning, DBMS, LaTeX, Node.js

## PROJECTS

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### Master's Thesis: CUDA-Accelerated Malware Detection

- Advised by Prof. Robert J. Walls, developed a GPU-accelerated version of the RevDecode algorithm, based on the Viterbi algorithm and sequence decoding, for detecting malware in binary function libraries.
- Designed three kernel approaches—Naive, Fine-Grained, and Segment-Based-Estimation—that achieved a 60x speedup, cutting processing time from 10 minutes (CPU) to 10 seconds (GPU).

### MiniJava Compiler

- Developed a modular compiler for MiniJava, a language subset of JAVA, featuring a lexer, parser, semantic analyzer, and code generator to translate high-level code into MIPS assembly for execution.

### Adaptive Threadpool

- Developed a Fork-Join thread pool with work-stealing to enable efficient parallel task execution by dynamically distributing workloads among idle threads.
- Tested with parallel algorithms including Fibonacci, merge sort, and quicksort.

### Dynamic Storage Allocator

- Designed a dynamic memory allocator using a segregated free list and block coalescing to minimize fragmentation, with thread safety enabling concurrent operations.
- Implemented memory allocation, deallocation, and resizing functions, achieving high space utilization and throughput validated through benchmarking.

### Unix Customizable Shell

- Designed a lightweight shell supporting external commands via `posix\_spawn` for process handling, along with built-in commands for job and process management.

### Textworld Reinforcement Learning Agents

- Implemented two neural network models—an LSTM agent to capture sequential dependencies and an LSTM with attention agent for enhanced input focus—for Microsoft's TextWorld, a platform for text-based games.

## EXPERIENCES

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**Virginia Tech** *Aug 2021 - Dec 2021*  
*Teaching Assistant*

- Supported CS 3304 - Comparative Languages, a course on programming language constructs, focusing on runtime behavior, fundamental elements in commercial systems, and variations in language implementations.

**China Eastern Airlines** *May 2020 - Aug 2020*  
*Software Engineer Intern*

- Assisted in managing flight and passenger information by scraping data from the company's public API and converting raw data into JSON format using Pentaho Data Integration (PDI).
- Worked on the front-end development of a company's mobile application for employees to report personal health conditions, using React.js for the interface and integrating it with RESTful APIs for data communication.