

# Ahmer Raza

[ahmerraza2017@gmail.com](mailto:ahmerraza2017@gmail.com) · [ahmerr.com](http://ahmerr.com) · 864.508.1948

## EDUCATION

---

### Clemson University

M.S. Mathematics, Statistics concentration

Clemson, SC

August 2024 – August 2025 (expected)

### Clemson University

B.S. Computer Science, Mathematics minor

Clemson, SC

4.0/4.0 GPA, Departmental Honors

August 2021 – May 2024

## RESEARCH EXPERIENCE

---

### Graduate Research

Fall 2024 – present

*Differential Privacy/Statistics (advisors: Dr. Chris McMahan and Dr. Rafael D'Oliveira)*

- Conducting research at the intersection of differential privacy and group testing. Looking at specific scenarios of group testing and their differential privacy guarantees.

### Honors Thesis Undergraduate Research/Graduate Research Assistant

Spring 2024 – present

*Hardware Cybersecurity (advisor: Dr. Zhenkai Zhang)*

- Conducting research to create a secure automotive Electronic Control Unit (ECU) for connected vehicles using RISC-V and TEEs. Secure ECU built from the bottom-up using Rocket Chip, Keystone Enclave, and external CAN bus hardware.
- Built and deployed a Rocket core-based System-on-Chip (SoC) on an Artix-7 FPGA; built and run a custom embedded version of Debian Linux on the SoC; modified and ported Keystone Enclave to the system; wrote SPI and CAN drivers for Keystone Enclave; and added Instruction Set Randomization (ISR) to the Rocket core CPU pipeline.
- Ongoing work to finish implementation of ISR and use the CARLA simulator to test the platform.

### Undergraduate Research

Summer 2023 – Fall 2023

*GPU Cybersecurity (advisor: Dr. Zhenkai Zhang)*

- Conducted research evaluating the feasibility, effectiveness, and mitigation techniques of bit disturbance attacks such as Rowhammer and RowPress launched from discrete GPUs on motherboard DRAM.
- Replicated Rowhammer results on a desktop computer and attempted to hammer pinned main memory from a discrete GPU using the CUDA DMA mechanism.
- Concluded Rowhammer and RowPress via CUDA DMA were infeasible due to long DMA engine program/unprogram times.

### Creative Inquiry

Fall 2023 – Spring 2024

*Robotics Systems Research*

- Designed a rigid-bodied autonomous robot that won 1st place among more than 50 universities in the IEEE SoutheastCon 2024 Hardware Competition.
- The robot included a chassis/drivetrain module, sensing modules, and an object manipulation module.
  - Chassis module included two-wheel drive to allow for in-place steering using omni wheels.
  - Sensor modules included DC motor encoders and line-following, time-of-flight, and light sensors.
  - Object manipulation module encompassed a three degrees-of-freedom (df) “hard” robotic arm with a one df gripper end effector.

*Nanotechnology*

- Conducted review research on quantum computing and the role of nanotechnology, nanomaterials, and nanodevices in quantum computers.

*Circuit Cellar*

- Designed and implemented a Printed Circuit Board (PCB) using Electronic Design Automation (EDA) tools.

*Arccos Golf*

- Created a custom user map correction feature for industry partner Arccos Golf to be integrated into their Arccos Caddie product line.

PUBLICATIONS

---

- [1] **A. Raza** and Z. Zhang, “carroot: A Secure TEE-Based Automotive ECU,” USENIX VehicleSec (unpublished).
- [2] **A. Raza** and Z. Zhang, “A Secure Automotive ECU for Connected Vehicles,” Honors Thesis, Sch. of Comp., Clemson Univ., Clemson, SC, USA, 2024. Available: [https://ahmerr.com/pdf/Honors\\_Thesis\\_Ahmer\\_Raza.pdf](https://ahmerr.com/pdf/Honors_Thesis_Ahmer_Raza.pdf)

POSTERS & PRESENTATIONS

---

- [1] **A. Raza** et al., “ROAR-E: a Winning Autonomous Robot for the IEEE SoutheastCon 2024 Hardware Competition,” Clemson Focus on Creative Inquiry, Clemson University, Watt Family Innovation Center, Apr. 3, 2024. Available: [https://ahmerr.com/pdf/Robotics\\_FoCI\\_Poster.pdf](https://ahmerr.com/pdf/Robotics_FoCI_Poster.pdf)
- [2] **A. Raza** et al., “Nanotechnology for Emerging Applications,” Clemson Focus on Creative Inquiry, Clemson University, Watt Family Innovation Center, Apr. 4, 2024.
- [3] **A. Raza** et al., “Circuit Cellar,” Clemson Focus on Creative Inquiry, Clemson University, Watt Family Innovation Center, Apr. 5, 2024.

HONORS & AWARDS

---

<b>SoutheastCon 2024 Hardware Competition</b>	March 2024
1st place in Hardware Competition at SoutheastCon 2024	
<b>Garrison Family Annual Scholarship</b>	2023 – 2024
<b>Frank M. Gunby Memorial Scholarship</b>	2023 – 2024
<b>South Carolina LIFE Enhancement</b>	2022 – 2024
<b>South Carolina LIFE Scholarship</b>	2021 – 2024
<b>Clemson University Scholarship</b>	2021 – 2023
<b>Clemson University President’s List</b>	Fall 2021 – Spring 2024
Awarded President’s List for all semesters at Clemson	
<b>GaSTC Gold Medal</b>	March 2019
1st place in Project Programming at the Georgia Student Technology Competition	

OUTREACH

---

<b>VEX V5</b>	Fall 2024
<i>Robotics Mentor &amp; Referee</i>	
<ul style="list-style-type: none"> <li>• Mentoring and refereeing VEX V5 teams from more than 6 high schools, middle schools, and elementary schools.</li> <li>• Teaching and helping transition to Python for robot programming.</li> </ul>	
<b>Pickens County Career &amp; Technology Center</b>	Fall 2024
<i>Python Teacher</i>	
<ul style="list-style-type: none"> <li>• Organizing interactive Python workshops at the PCCTC to teach Python to high school students.</li> </ul>	

## MEMBERSHIPS

---

### IEEE Clemson Student Branch Leadership

Spring 2024

Webmaster for the IEEE Student Branch at Clemson

### IEEE Student Member

Spring 2024 – present

### ACM Student Member

Spring 2024 – present

### Alpha-Lambda-Delta Honor Society

Spring 2022 – present

### Clemson University Honors College

Fall 2021 – Spring 2024

## PROJECTS

---

### MIPS Simulator

- Cycle-accurate command-line simulation of a MIPS pipelined processor.
- Handles `lw`, `sw`, `beq`, `add`, `sub`, `and`, `or`, `slt`, and `j` instructions.
- Dynamically detects and handles data and control hazards.

### C-Natural

- Custom programming language and transpiler made to facilitate beginners' learning of advanced programming concepts. Developed for CUHackit 2023.

### C Server

- Simple HTTP parser and web server written in C.
- Serves a single file, buffered in memory or unbuffered using sockets.

### Periodic Table

- Interactive Java-based Periodic Table app with extensive information about each element.
- Won 1st place in Project Programming at GaSTC 2019.

## SKILLS

---

### Programming Languages

- C/C++
- Java
- Python
- JavaScript/TypeScript
- HTML/CSS

### Software Tools

- Git/GitHub
- NodeJS/NPM platform
- Arduino/PlatformIO
- Intel Quartus II Design Software
- Xilinx Vivado Design Suite
- Solidworks 3D design
- KiCad/EasyEDA

### Hardware Experience

- Raspberry Pi 4 computer
- Raspberry Pi Pico MCUs
- Digilent Arty A7-100T with Xilinx Artix-7 FPGA
- Through-hole PCB and SMD soldering
- 3D printing