Rachel J. Ha

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OBJECTIVE

Graduate Electrical and Computer Engineering student pivoting into embedded systems, electrical and digital design, silicon/materials and hardware tech, emerging architecture, and product design and development. A self-driven professional with proven ability to tackle complex problems using strong analytical, communication (both written and verbal), and problem-solving skills. Actively recruiting for internships.

EDUCATION

Georgia Institute of Technology | Atlanta, GA *August 2022 – Present*

- Bachelor of Science in Computer Engineering (Cybersecurity & Telecommunications), Minor in Economics, GPA 3.72 **May 2025**
- Master of Science in Electrical and Computer Engineering

Yonsei University | Seoul, South Korea (12 Credit Hours) *August 2024 – December 2024*

Georgia Tech-Europe | Metz, France (13 Credit Hours) *May 2023 – August 2023*

SKILLS

Programming: Java, Python, C, C++, MIPS Assembly, VHDL, System Verilog, RISC-V Assembly, Linux, Shell, SQL, HTML, CSS, JavaScript
Hardware: Microcontrollers, FPGAs, Oscilloscope, Logic Analyzer, Microprocessors, DE-10, PCB Fabrication, Circuit Design
Software: Altera Quartus II, NI LabVIEW, GitHub, IDA Pro, MATLAB, Wireshark, SolidWorks**,** Ubuntu, EAGLE, PyTorch, MS Office, Power BI, Azure
Organizations: Georgia Tech Women in Electrical and Computer Engineering, Alpha Xi Delta, Club Ice Hockey
Languages: English (fluent), Korean (fluent), Spanish (awarded CT Seal of Biliteracy 2022), French (conversational)

EXPERIENCE

Software and Data Engineering Intern @ Avanos Medical | Atlanta, GA *June 2025 – Present*

- Analyzes and transforms large volumes of raw sales data using Excel, Power BI, and SQL to build interactive dashboards that visualize performance metrics and KPIs across product sectors, regions, and time periods
- Integrates Microsoft Copilot and generative AI capabilities empowering non-technical users to interact with data via natural language queries and receive real-time analytical responses

High-Voltage Bushing Design and Fabrication Undergraduate Research Intern | Atlanta, GA *January 2024 – February 2025*
Dr. Lukas Graber, Georgia Tech Department of Electrical and Computer Engineering

- Evaluated and selected thermoset materials, liaised with manufacturers, and presented findings, leading to the adoption of optimized bushing materials enhancing tensile strength, thermal conductivity, and specific heat capacity
- Automated and streamlined the bushing fabrication process using LabVIEW, accounting for precision and safety in pressurized systems for thermoset quantities ranging from 10g to 125kg

ECE Peer Leader Fellow | Atlanta, GA *August 2023 – May 2025*
The ECE PL Fellowship is a highly competitive leadership development program for upper-level Electrical and Computer Engineering students to mentor new ECE majors. Fellows must be thoroughly knowledgeable in resources, opportunities, and experiences relating to ECE @ GT and beyond.

Teaching Assistant for Programming for Hardware & Software Systems *May 2024 – May 2025*

- Develops and grades assignments, projects, and exams, ensuring clarity and alignment with course objectives devoting 10+ hours/week
- Offers mentorship to 250+ students, addressing individual challenges regarding embedded systems development, low level optimizations in C and assembly, and application development

Structured Information for Precision Neuroengineering Undergraduate Researcher | Atlanta, GA *February 2024 – May 2024*
Dr. Sankar Alagapan, Georgia Tech Department of Electrical and Computer Engineering

- Aided in designing a neural network leveraging ML to analyze EKG data and predict physiological responses, driving innovation in bio-sensing technologies
- Implemented MATLAB programs to streamline data collection, reducing the need for manual attention and intervention by 300%

HapCompass Bioinformatics Student Researcher | Storrs, CT *July 2021 – June 2022*
Dr. Derek Aguiar, UCONN Department of Computer Science and Engineering

- Optimized a greedy algorithm for haplotype assembly, increasing accuracy and efficiency compared to competitors
- Implemented Dijkstra's, Kruskal's, and Boruvka's algorithms in Python to supplement advanced haplotype reconstruction

PROJECTS

Tower Commander - Aeroponic Farm Sensing Unit (Electrical Lead) | Senior Capstone *January 2025 – May 2025*

- Designed and developed a multi-sensor system to monitor pH, EC, temperature, and water depth, with battery life of 90+ days
- Engineered custom PCB and signal conditioning circuitry to integrate analog and digital sensors for accurate data acquisition
- Implemented and optimized embedded software to process sensor signals and streamline farm operations, saving 80+ labor hours per day and reducing labor costs by $750,000 annually

Cyber-Physical Security and Resilience Engineering for UAV Systems | Cybersecurity of Drones *January 2025 – May 2025*

- Engineered a Software-in-the-Loop simulation to analyze and mitigate GPS sensor failures, simulating jamming and spoofing attacks, examining EKF response, and proposing algorithmic improvements to enhance drone fail-safe mechanisms
- Developed and executed custom security protocols for UAV communication by intercepting MAVLink messages, injecting malicious commands, and evaluating encryption techniques to reinforce resilience against cyber threats
- Conducted in-depth analysis of EKF performance by introducing spoofed sensor data, monitoring state estimation drift, and modifying filter parameters to improve UAV robustness under adversarial conditions

DRAM Analysis (Project Lead) | Electronic Materials *November 2024*

- Directed a team of 5 in developing innovative approaches for high-bandwidth memory applications at Samsung and SK Hynix, driving advancements in semiconductor materials with focus in silicon properties and applications
- Conducted comparative analyses of U.S. and Korean semiconductor markets, forecasted trends, and designed material innovations introducing new solutions to improve DRAM performance

Power Optimization in Device-to-Device Communications | Wireless Communication Systems *November 2024 – December 2024*

- Designed and trained a deep reinforcement learning model optimizing power allocation and improving both energy efficiency and throughput in device-to-device (D2D) networks by implementing an algorithm focused on reinforcement learning
- Integrated communication theory with modern AI techniques, including DRL policy optimization, threshold satisfaction assurance, and parallel Deep Q-Networks
- Achieved stabilized convergence for both training loss and training reward showing effective handling of tradeoff between system capacity and energy efficiency

Malware Reverse Engineering | Introduction to Malware Reverse Engineering *January 2024 – May 2024*

- Successfully reverse-engineered malware, including viruses and worms such as Michaelangelo, Harulf, Lucifer, DOS7, and SQLSlammer
- Extracted and documented payload functionalities, control flows, and obfuscation techniques employed by the malware
- Improved proficiency in low-level programming, debugging, and understanding of binary execution environments

Trivia Trek - Interactive Learning Embedded Board Game (Design Lead) | Junior Capstone *January 2024 – May 2024*

- Directed the design of a customizable trivia board game integrating LCDs, Micro:bit processors, and feedback servos for educators
- Led risk management, design reviews, and development processes, simulating real-world CI/CD and Agile/Scrum methodologies

FPGA Peripheral Metronome | Digital Design Laboratory *November 2023 – December 2023*

- Managed a team of 5 ensuring delegation of tasks, completion of project deliverables, and mitigation of project risks given short timeline
- Implemented an interactive metronome using a Servo and DE-10 FPGA board allowing customization of 256-time signatures at various tempos, producing audible beat patterns and matching visual LED displays

Embedded Missile Videogame | Programming for Software & Hardware Systems *July 2023 – August 2023*

- Designed and implemented the Atari video game on breadboard using MBED microcontroller, LCD display, speaker, joystick, and push switches, enhancing system capabilities and elevating user interaction with multiple levels and dynamic, customizable game features
- Programmed in C and MIPS, bridging high-level and low-level programming to create a seamless, fully functional breadboard video game