

# Brooke Chalmers

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## Education

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**Northeastern University**, Boston MA, *expected graduation May 2025*

Candidate for Bachelor of Science in Computer Science, Honors Program

**GPA: 3.89/4.0**, Dean's List all semesters

Relevant coursework: *Fundamentals of Computer Science I & II (accelerated)*, *Mathematics and Data Models*, *Intro to Cybersecurity*, *Theory of Computation*, *Object-Oriented Design*, *Algorithms and Data*

**Scarborough High School**, Scarborough ME, *September 2019 - May 2021*

**Maine School of Science and Mathematics**, Limestone ME, *September 2017 - May 2019*

National Merit Scholar, Maine All-Star Math Team in 2018 and 2019

**Skills:** Python, Rust, JavaScript (client and server), TypeScript, CSS, Tailwind, React, Java, C++, AVR and ARM processors, Git, Linux, Docker, Bash and Zsh, Redis, SQL, MOS 6502 assembly

## Work Experience

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**Teaching Assistant**, Khoury College at Northeastern University, *Sept 2022 - Dec 2022*

Provided one-on-one assistance to students in a fundamentals of CS course. Conducted labs, planned assignments, and graded submissions as part of a small team. Worked to modernize and adapt existing course material from previous semesters. Monitored student understanding to adjust the pacing of instruction.

**Manufacturing Specialist Operator**, Texas Instruments Inc., *June 2021 - August 2021*

Operated about two dozen semiconductor photolithography machines in a cleanroom environment. Scheduled and batched work, monitored equipment for malfunctions, and performed basic maintenance. Proposed an optimization to workflow involving automated materials stocking which was later implemented across the site.

## Activities

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**Software Team Co-Lead**, Northeastern University Mars Rover Team, *Fall 2021 - Current*

Led the development of an entirely new base station control interface using web technologies, replacing the old Qt-based interface. Worked with teammates across electrical, firmware, and software teams to integrate various readouts and control parameters into the UI. Held a series of onboarding lectures and created reference materials covering React, ROS, and other frameworks in the software stack. Competed at the 2022 University Rover Challenge in Utah.

**Team Captain**, Red Storm Robotics at Scarborough High School, *Fall 2019 - Spring 2021*

Founded a new VEX Robotics team. Recruited and onboarded members, helped teammates understand relevant software and mechanical engineering concepts. Trained teammates on basic embedded programming with C++, use of Git, and proper software documentation. Held sessions to discuss competition requirements and design potential solutions. Contributed code upstream to the popular OkapiLib robotics library.

## Projects

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**Modular Retro Emulation Framework for Desktop and Web**, *Fall 2022*

Developed a project in Rust for emulating the Commodore 64, VIC-20, PET, and other machines based on the MOS 6502 CPU. Organized a small team to build out support for additional systems and peripherals. Implemented both GPU-accelerated desktop support and WebAssembly support for web deployment.

**LiDAR-based Expressive MIDI Controller**, *Spring 2022*

Created a new musical interface device using a LiDAR sensor to detect the position of the user's hands in free space. Implemented a rule-based strategy in Python to process point cloud data into four separate axes, then used a virtual MIDI port to interface with existing digital audio workstation software.

**Addressable LED Choker and Companion Android App**, *Fall 2021 - Spring 2022*

Built several necklaces using addressable WS2812B LED strips and various ARM microprocessors. Designed and implemented a resilient serial protocol for selecting an animation and providing parameters. Created an app using React Native allowing the user to select colors and send animation commands over USB or Bluetooth.

**Computer Vision Based Local Positioning System for Robotics**, *Summer 2020*

Implemented a system for detecting the position of objects within a camera scene using custom computer vision markers by applying contour finding, the Douglas-Peucker polygon finding algorithm, and projective transformation matrices.