

# Sam Belliveau

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## EDUCATION

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### **Cornell University**

*Bachelor of Engineering in Electrical Computer Engineering*

Ithaca, NY

*Aug. 2023 – May 2026*

### **Hofstra University**

*Bachelor of Engineering in Computer Engineering*

Hempstead, NY

*Aug. 2022 – May 2023*

### **Stuyvesant High School**

*Regents Diploma with Advanced Designation with Honors*

New York, NY

*Sept. 2018 – Jun. 2022*

**Related Courses:** Discrete Structures Computer Science I-III, Introduction to Algorithms, Linear Algebra, Differential Equations, Data Science for Engineers, Signals & Systems

**Related Courses:** Discrete Structures Computer Science I - III, Digital Logic & Computer Organization, Differential Equations, Linear Algebra, Signals & Systems, Physics Mechanics, Data Science for Engineers, Electromagnetic Fields and Waves

## TECHNICAL SKILLS

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**Languages:** C, C++, C#, Python, Java, Rust, Swift, Go, JavaScript, Verilog HDL, SQL, HTML, GLSL, Bash / ZSH

**Technologies:** Git, Linux, Docker, VS Code, Robot OS (ROS), Cassandra, BigQuery, Numpy, Scipy, PyTorch

**Languages:** C, C++, C#, Python, Java, Rust, Swift, Go, JavaScript, Verilog HDL, SQL, HTML, GLSL, Bash / ZSH

**Technologies:** Git, Linux, Docker, VS Code, Robot OS (ROS), Cassandra, BigQuery, Numpy, Scipy, PyTorch, GenAI

## EXPERIENCE

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### Undergraduate Researcher

June 2024 – Present

*Abe Davis's Group @ Cornell University*

*Ithaca, NY*

- Rewrote 7,252 lines of code to build a well documented, expandable foundation for the ReCapture project in Swift
- Implemented a relational database allowing for the storage and indexing of 20+ features over a large set of images

### Robotics Software Engineer

November 2023 – Present

*Cornell University Autonomous Underwater Vehicles*

*Ithaca, NY*

- Reduced CPU usage by 80% by implementing Kalman Filtering using Nvidia's CUDA framework for linear algebra
- Improved submarine movement by implementing least squares optimization for determining thruster speeds

### Signal Analysis Intern

January 2023 – May 2023

*Feinstein Institute for Medical Research*

*Manhasset, NY*

- Automated Sharp Wave Ripple (SWR) detection using Python and SciPy to analyze EEG data
- Researched SWRs, which help predict the onset of seizures, in order to improve the accuracy of the detection

### Mechanical Engineer

December 2022 - March 2023

*ASME @ Hofstra University*

*Hempstead, NY*

- Led game and infrastructure development for school events and charities
- Headed various design projects at the behest of the school

### VEX Robotics Coach / Mentor

October 2022 – May 2023

*PLAYIDEAs NY.*

*Great Neck, NY and Manhattan, NY*

- Coached 3 local VEX robotics of 6-8 students each, teaching them the basics of robotics and programming
- Developed lesson plans to teach students about PID control, Odometry, and very simple digital filtering

### Software Intern on Consumer Product Team

July 2022 – September 2022

*Reddit Inc.*

*Remote*

- Worked with Taxonomy Group, which classified the safety of +138,000 subreddits on Reddit
- Developed a script that created realistic test data in order to verify the accuracy of the safety classification models
- Improved flagging of problematic content by adding statistics to the dashboard to find content that needed review

### Software Intern on Consumer Product Team

July 2021 – September 2021

*Reddit Inc.*

*Remote*

- Created comprehensive unit tests to catch bugs before deploying to production
- Worked with tools such as BigQuery and Cassandra to send notifications reminding moderators to fill out surveys

### President of Software Engineering

December 2018 – June 2022

*StuyPulse Robotics*

*Manhattan, NY*

- Led and taught team of 50 members to write software for a 120lb robot that competed in FRC Championships
- Implemented, taught, and documented PID control, Odometry, Digital Filtering, and Motion Profiling
- Communicated software design to competition judges and won 4 Innovation in Control Awards

## PROJECTS

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- iOS Application: ReCapture** | *Swift, SwiftUI, iOS, Json, OpenCV, Computer Vision* June 2024 – August 2024
- Rewrote ReCapture, an application that helps users take photos of subjects over time in order to create timelapses
  - Implemented Computer Vision algorithms that indexed the metadata to automatically create unique visualizations
- UCI Chess Engine in Rust** | *Rust, Min Max, Alpha Beta Pruning, Chess* June 2023 – July 2023
- Developed a Chess Engine in Rust that achieved an Elo of 2700 (Grand Master level)
  - Implemented Alpha Beta Pruning using high performance Rust to achieve a higher elo rating
- Dolphin Emulator** | *C++, GLSL, JIT Recompilation* September 2022 – Present
- Improved performance of emulation software by scaling frequency of video interrupt signals for low-end hardware
  - Introduced 6 GPU accelerated resolution scaling algorithms to improve the image quality for all display resolution
- GameBoy Emulator** | *Rust, Z80 Assembly, Hardware Emulation* August 2021 – December 2021
- Implemented entire instruction set for the GameBoy's Z80 CPU using only publicly available documentation
  - Developed rudimentary PPU (Pixel Processing Unit) to render sprites and tiles on the screen
- StuyLib** | *Java, JavaDocs, JitPack, Control Theory, Digital Filtering* January 2020 – August 2022
- Initiated and led the development of StuyLib, an award-winning Control Theory Library
  - Heavily maintained and documented the library to ensure its longevity and ease of use