

# JOSHUA CHONG

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## EDUCATION

**CARNEGIE MELLON UNIVERSITY**, School of Computer Science

Pittsburgh, PA

B.S. in Computer Science, Concentration in Machine Learning (Expected May 2028)

August 2025 – Present

*Cumulative GPA*: 3.77, Dean's List with High Honors, 2x

*Relevant Coursework*: Mathematical Foundations for Computer Science (15-151); Principles of Imperative Computation (15-122);

Principles of Functional Programming (15-150); Great Ideas in Theoretical Computer Science (15-251); Intro to Computer Systems (15-213); AI & ML I (07-280); Probability and Computing (15-259);

**HUNTER COLLEGE HIGH SCHOOL**

New York, NY

8th-12th Grade

September 2020 – June 2025

## EXPERIENCE

**CARNEGIE MELLON RACING**

Pittsburgh, PA

Path Planning Captain

September 2025 – Present

- Led a 10-person path planning subteam developing autonomous navigation software for a Formula SAE electric race car, including trajectory optimization, localization, and simulation-based validation, within a 150-member multidisciplinary engineering team
- Coordinated software development through issue tracking, pull request reviews, technical documentation, and sprint planning
- Improved vehicle lap time by 17% in CarMaker simulations by implementing a B-spline minimum-curvature trajectory optimizer
- Developed an Extended Kalman Filter localization system that fuses odometry and cone detections for autonomous navigation
- Implemented a graph-based SLAM system in ROS 2 (C++) using GTSAM/iSAM2 with robust data association, loop closure, and offline evaluation to generate globally consistent cone maps for autonomous Formula SAE racing

**VEX ROBOTICS TEAM**

New York, NY

Lead Programmer

June 2020 – April 2025

- Achieved a global top 1% ranking (Top 200 of 20,000+ teams) by developing adaptive pure pursuit algorithms and PID control systems in C++

**METAVETHICS INSTITUTE**

New York, NY

Researcher and Co-Author

May 2024 – February 2025

- Co-authored a paper accepted at IHSI 2025 on safety, inclusion, and ethical considerations in VR/AR workspaces
- Conducted a literature review of 300+ academic papers on VR/AR workplaces, identifying key safety and inclusion risks

## PROJECTS

**CHESS ENGINE**

- Built a C++20 chess engine featuring alpha-beta search, iterative deepening, quiescence search, transposition tables, legal move generation, perf-tested correctness, and full UCI support
- Designed and optimized evaluation and search systems including Zobrist hashing, move ordering, pruning techniques, king-safety evaluation, pawn-structure analysis, and endgame heuristics
- Developed an SFML GUI for human play and evaluated engine strength through matches against calibrated Stockfish levels, achieving an estimated rating of ~1850 Elo

## AWARDS & HONORS

- 2nd-place Driverless and 4th-place overall finish among 100+ teams at Formula SAE Electric Michigan 2026
- 3x AIME Qualifier, Distinction on AMC 10
- NYC Math Team member; selected as 1 of ~60 students representing New York City at national competitions ARML and NYSML
- 3x VEX Robotics World Championship Qualifier
- Peak USCF chess rating of 1912

## TECHNICAL SKILLS

- **Languages**: Python, C++, C, Java, SML
- **Frameworks/Tools**: Linux, ROS 2, Docker, CarMaker, Git, LaTeX