Charles Beck

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Education

University of Michigan — Ann Arbor, MI
Bachelor of Science in Computer Science — *Aug. 2023 – May 2027*
- **Relevant Coursework**: Data Structures & Algorithms, Computer Organization, Discrete Math, Web Systems, Database Management Systems, Programming & Data Structures

Experience

Yazaki North America — September 2025
Incoming Business Analyst Co-op - ECI Sales — *Canton, MI*

Capoom – PJTL @ Mcity — Aug. 2025 – Present
Software Engineer Intern (Academic Program) — *Ann Arbor, MI*
- Developing a machine learning pipeline leveraging **Gaussian splatting** to generate **photorealistic 3D models**, improving spatial fidelity for autonomous vehicle simulation and **digital twin** systems.

Yazaki North America — May 2025 – August 2025
Software Engineering Intern - Electronics & Instrumentation — *Canton, MI*
- Built a **C++ tool** to extract MISRA deviations from **QA Verify XML reports** and populate a versioned compliance database, reducing reporting time by **over 90%** and enabling automated multi-baseline analysis.
- Redesigned relational schemas to support **longitudinal compliance tracking**, improving audit readiness and unlocking historical trend analysis across software baselines.
- Developed a Python script to convert inconsistent YC SOV PDFs into structured YNA Excel spreadsheets using **pandas** and **xlsxwriter**, transforming a **60-minute manual task into a flawless, 30-second automation**.

Michigan Mars Rover — January 2025 – Present
Autonomous Navigation — *Ann Arbor, MI*
- Architecting a **ROS 2-based state machine** to manage autonomous navigation modes, including Waypoint, Search, and Gate Traversal, for complex mission scenarios.
- Implementing a long-range path planner that incorporates **failure zone avoidance algorithms** to ensure safe and efficient waypoint navigation over challenging terrain.
- Integrating **SLAM and vision-based localization** for precise rover positioning and fiducial marker detection, validating performance through rigorous simulations and live rover field trials.

Michigan Hackers — August 2024 – May 2025
Quantitative Developer — *Ann Arbor, MI*
- Developed Python-based quantitative trading strategies (e.g., **MSTR/BTC arbitrage, mean reversion**) and a **Backtrader framework** to backtest performance on historical market data.

Projects

EECS Grade Calculator (eecsgradecalc.xyz) | *React, TypeScript, Vite, CSS Vars* — February 2025 – Present
- Developed a dynamic single-page application to accurately forecast grades by modeling **complex, syllabus-specific rules** like weighted averages, score drops, and conditional logic.
- Engineered a **scalable, data-driven architecture** using a robust TypeScript type system, separating concerns between course-specific configuration files and modular React components.

Doodle Jump on Arduino | *C++, Embedded Systems, LED Matrix, Adafruit GFX* — Nov. 2023 – Dec. 2023
- Engineered a complete Doodle Jump clone in C++, designing a **modular, object-oriented game engine** to manage physics, game state, and collision detection on an Arduino.
- Aggressively optimized all logic to operate within a **2KB RAM constraint**, implementing features like varied platform types, projectiles, and responsive potentiometer-based controls.

Rowing Performance Prediction | *Python, scikit-learn, Pandas* — August 2025 – Present
- Developing an ML pipeline using gradient boosting to predict athletic performance from historical training data, with an interactive web dashboard for performance analysis.

Technical Skills

Languages: C/C++, Python, Java, SQL, JavaScript/TypeScript, HTML/CSS
Frameworks/Libraries: React, ROS 2, NumPy, pandas, xlsxwriter, scikit-learn, Backtrader, TailwindCSS
Developer Tools: Git, Linux, VS Code, LaTeX, Windchill RV&S, Arduino