

# Zachary T. Hoffman

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## Education

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**Liberty University: B.S. Software Engineering, Mathematics Minor**

Lynchburg, VA

**GPA: 4.0**

Aug. 2022-May 2026

## Projects

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### Machine Learning Racing Simulation

Sept. 2024

*Repo: Machine\_Learning\_Racing\_Simulation*

- Engineered a **machine learning** model using **NEAT (NeuroEvolution of Augmenting Topologies)** to optimize vehicle behavior, leveraging **neural networks** to improve racing performance through dynamic learning and adaptive strategies
- Designed and implemented a **custom physics engine** simulating real-world driving constraints, including velocity, downforce, and traction, to accurately control vehicle movement and ensure high-fidelity collision detection
- Built an **interactive simulation** environment using **Pygame**, allowing real-time user interaction for track creation and live **AI performance visualization**, showcasing a full-stack development approach from machine learning to front-end rendering

### Pawn's Revenge (Object-Oriented Game Development)

April 2023

*Repo: Pawns-Revenge-Python*

- Developed a modular, **event-driven** system using Python, demonstrating **advanced object-oriented programming** skills and class hierarchy to manage multiple interacting entities
- Designed **custom physics** and **AI behaviors** for game entities, showcasing **problem-solving** abilities in dynamic systems similar to robotic control algorithms
- Utilized **real-time input handling** and **event loops**, simulating real-world timing and event-based decision-making, relevant to robotics and real-time systems

## Experience

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### Liberty University

Lynchburg, VA

*Competitive Programming Club*

Aug. 2022- Present

- Placed **2nd place** in the **2023 ACM ICPC Div. II Mid-Atlantic Region**, demonstrating advanced problem-solving and algorithmic skills
- Collaborated in a team environment to solve advanced algorithmic challenges under timed conditions

### French Creek Golf Club

Elverson, PA

*Bagroom Attendant*

Aug. 2020- Aug. 2024

- Led a team of **5** employees, utilizing **communication** and **leadership** skills to maintain smooth daily operations delivering high-quality **customer service** to **100+** golfers daily, ensuring prompt assistance and resolving issues to enhance customer satisfaction

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**Languages:** Java, Python, C++, Javascript, CSS, HTML, SQL

**Software/Tools:** Git, Linux, Mathematica, Arduino, ER Assistant, SQL Server Management Studio