# Daniel Zhan

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## Education

**Johns Hopkins University** - M.S. Robotics: expected Dec. 2025

**Cornell University** - B.S. Computer Science, Engineering Physics: graduated May 2023

Notable Coursework: Machine Learning, Robot Learning, Algorithms, Operating Systems, Computer System Organization, Analytical Mechanics, Electrodynamics, Electronic Circuits, Mathematical Methods for Physicists, Experimental Laboratory

Served as a Teaching Assistant for: Mechanics and Heat, Electromagnetism, Waves and Quantum Physics, Data Analytics

## Experience

**Research Assistant** - Terradynamics Lab, Johns Hopkins University | Nov. 2023 - Present

- Simulated robot traversals through various obstacles to discover energy-efficient locomotion strategies in C++.

**Software Engineer** - Lockheed Martin | Aug. 2023 - Present

- Implemented server-side functionality to enable usage of a default radar search algorithm in Java and SQL.
- Executed build verification and regression tests for new backend features to identify and correct critical issues.

**Software Engineer** - Cornell Mars Rover, Cornell University | Sept. 2020 - June 2023

- Upgraded the C++ robotic arm control software package from ROS 1 to ROS 2, reimplementing all core functionality.
- Implemented a Forward Kinematics control scheme for manipulation of joint angles, enabling precise arm control.
- Designed and implemented an Inverse Kinematics control scheme for the robotic arm, achieving a >90% reduction in arm task completion time by enabling direct end-effector position and orientation manipulation.

**Research Assistant** - Cornell University | Sept. 2021 - May 2023

- Developed a computational quantum dynamics model of the Nitrogen-Vacancy center in diamond in Python using the QuTiP package. Discovered a ~20% reduction in transition photoluminescence upon driving the defect at resonance.
- Developed upon a 2D two-fluid MHD simulation of an ablating plasma in Fortran 90. Experimented with various magnetic fields and material configurations to produce coherent plasma jets for use in nuclear fusion applications.

**Physics Laboratory Technician Intern** - Honeywell | June 2021 - Aug. 2021

- Developed an automated tester for Honeywell's ion trap chip, ensuring its electrical properties met all specifications.
- Reduced ion trap chip testing time by 95% through a Python-based test suite with live calibration, capacitance and resistance tests, custom settings, and a modern GUI, eliminating human error and simplifying testing procedures.

## Projects

- **Aphelion Defense**: I led a team of 10 to develop a mobile video game developed in C++, featuring networked multiplayer. As team lead, I proactively fostered a productive and focused team environment, facilitated communication between different sub-teams, and mediated team conflicts and disputes. As a programmer, I implemented unit pathfinding algorithms as well as modular graphics and UI systems. This game is available in beta.
- **County Political Leaning Predictor**: I developed a machine learning model using PyTorch to predict the political leaning of every U.S. county using demographics data. It achieved >80% accuracy against 2016 election results.
- **Flappy Bird AI**: I developed a reinforcement learning model to train on Flappy Bird using Python and PyGame. After learning for several hours, the AI achieved a score of over 10,000, an impossible score to achieve for humans.

## Skills and Miscellaneous

**Skills**: Research, Robotics (ROS, MoveIt), Software Development, Computational Modelling, Circuit Design and Analysis, Machine Learning (Pytorch), Programming Languages (Python, C++, Java), Databases (SQL), Version Control (Git), Linux, Unix

**Interests:** Competitive Badminton, Amateur Weightlifting, Chess (sometimes), Video Games (Counter Strike 2, Civilization V)