

# Atiksh Bhardwaj

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## Education

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**Carnegie Mellon University, Robotics Institute at School of Computer Science**

Pittsburgh, PA

Master's of Science in Robotics [**Supported by NSF GRFP**]

August 2026

**Cornell University, College of Engineering**

Ithaca, NY

Bachelor of Science in Computer Science

Expected Dec 2025

GPA: 3.97/4.00

**Honors and Awards:** Dean's Honors List (2022-2025), CS Honors Program, National Merit Jerry R. Junkins Scholarship for \$5000

**Related Courses:** Deep Learning for Robotics, Numerical Analysis of Differential Equations, Algorithms, Robot Learning, Reinforcement Learning, Machine Learning, Computer Vision, Artificial Intelligence, Functional Programming, Systems and Organization, Discrete Math, Computational Algebra, Honors Data Structures, Abstract Algebra

## Experience

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### Research Experience

August 2026 | Google Scholar: [<https://scholar.google.com/citations?user=gryqnyAAAAAJ&hl=en>]

- **Graduate Robot Learning Researcher** under Prof. Andrea Bajcsy at the Intent Lab [<https://cmu-intentlab.github.io/>] at Carnegie Mellon University
- Supported by the NSF GRFP [<https://www.nsfgrfp.org/>]

January 2026-Present

- **Research Assistant** under Prof. Preston Culbertson at Cornell University

May 2023-December 2025

- **Undergraduate Robotics and Machine Learning Researcher** under Prof. Sanjiban Choudhury at PoRTaL Lab: [<https://portal.cs.cornell.edu/>] during semester for course credit
- Interned under the Bowers Undergraduate Research Experience during summer 2023 for a **\$5000 fellowship** and summer 2024 for a **\$7000 fellowship**

### Vision-Language-Action (VLA) Interpretability [Current Project]

- Leading a project with 2 graduate students advised by Prof. Preston Culbertson and Prof. Wei-Chiu Ma
- Focused on steering latent dynamics understandings stored in VLAs for safer and more natural motion

### X-Diffusion: Training Diffusion Policies on Cross-Embodiment Human Demonstration

Under Review at the IEEE International Conference on Robotics and Automation (ICRA) 2026

- Evaluated experiments on baselines including Diffusion Policy and Point Policy on both human robot data showing that X-Diffusion achieves a **20-30% improvement over each of the baselines**
- Collected **200+ trajectories** on real robot using Space Mouse controller and **100+ trajectories** of human infeasible and feasible motion on four manipulation tasks

### A Smooth Sea Never Made a Skilled SAILOR: Robust Imitation via Learning to Search

Publication at the Conference on Neural Information Processing Systems (NeurIPS) 2025

- Formulated experiments with DINO-based pretrained encoder to improve performance and reduce training time to **eliminate need for warm-up steps and increased interaction steps**
- Built custom wrappers for data collection via both Space Mouse and Dualsense Controllers
- Collected **1000+ trajectories** in simulation for training and evaluation of pipeline across for twelve tasks across three key simulators: Robocasa, Robomimic, Maniskill
- **Spotlight Paper at NeurIPS 2025 (Top 3% of papers; 688 selected out of 21544 submissions)**

### MOSAIC: Modular Foundation Models for Assistive and Interactive Cooking

Publication at the Conference on Robot Learning 2024 (CoRL) 2024

- Engineered vision-based system for human pose tracking via Google's MediaPipe to run InteRACT in simulated kitchen setting replacing the need for OptiTrack's 10-camera motion capture system
- Programmed motion primitives for Franka Robot to plan according to human intent predictions
- Coded collaboration between Franka and Stretch robots orchestrated by ChatGPT-4 LLM task planner
- **Best Paper at ICRA 2024 VLNMN Workshop and Best Poster at ICRA 2024 MoMa Workshop**

### **InteRACT: Transformer Models for Human Intent Prediction Conditioned on Robot Actions**

Publication at ICRA 2024

- Designed ROS framework with OptiTrack's 10-camera motion capture system to map human movement to Franka Robot and project both human and robot skeletons for 3D motion collection
- Developed Collaborative Manipulation Dataset (CoMaD) with **488 human-human interactions and 304 human-robot interactions for 7 hours of motion** for kitchen settings
- Coded Alignment loss for training transformer architecture to compare human motion versus robot motion matching the differences between embodiments

### **ManiCast: Collaborative Manipulation with Cost-Aware Human Forecasting**

Publication at CoRL 2023

- Crafted ROS framework to project custom object models from specific kitchen tasks such as ketchup and a cooking pot for figure generation and data collection
- Collected 32 new human-human trajectories for training via ROS pipeline, created figures and edited final paper

## **Teaching Assistant (TA) Experience at Cornell University**

August 2023-December 2025

- **Taught 5 courses over 5 semesters**
- Authored programming and written assignments over course concepts
- Wrote proof-based exam questions, proctored both midterms and final exams, supervised final projects
- Facilitated office hours weekly mentoring undergraduate and graduate students for homework assignments and lecture review

### **Machine Learning TA**

August 2025-December 2025

- CS 3/5780: Intro to Machine Learning under Professor John Thickstun: content covering teaching preliminary machine learning concepts such as perceptron, gradient descent, and random forests
- Course taken by both graduate and undergraduate students
- Scripted projects in Jupyter Notebook and PyTorch on **Stochastic Gradient Descent and Kernels**

### **Reinforcement Learning TA**

January-May 2025

- CS 4/5789: Intro to Reinforcement Learning under Professor Wen Sun: content covering Markov Decision Processes, Reinforcement Learning with Human Feedback, and Proximal Policy Optimizations
- Course taken by both graduate and undergraduate students
- Developed Python project on **Proximal Policy Optimizations and Natural Policy Gradients**
- Designed proof-based homework assignment on imitation learning including DAgger

### **Robot Learning TA**

August-December 2024

- CS 4/5756: Intro to Robot Learning under Professor Sanjiban Choudhury: content covering Markov Decision Processes, Behavior Cloning, and Model-Based Reinforcement Learning applied to robotics
- Course taken by both graduate and undergraduate students
- Programmed Jupyter Notebook project on **World Models and Proximal Policy Optimizations**

### **Artificial Intelligence TA**

January-May 2024

- CS 4700: Intro to Artificial Intelligence under Professor Kevin Ellis: content covering A\* Search, Bayesian Optimization, and Decision Trees

## Functional Programming TA

August-December 2023

- CS 3110: Intro to Functional Programming under Professor Dexter Kozen and Professor Justin Hsu: content covering teaching OCaml and Modular Programming

## Industry Experience

### Texas Instruments Software Engineering Internship

May-August 2025 (Dallas, Texas)

- Optimized recurrent neural networks including Gated Recurrent Units (GRU) and Long Short-Term Memory (LSTM) models on internal hardware via open-source Tensor Vector Machine (TVM) code generation
- Improved performance on internal hardware by **13 times** through custom code generation and nearly **4 times** versus both competitor and open-source hardware
- Mastered repository management skills, developed purely in C and Python, and accelerated several PCB boards with custom hardware, diagnosing critical hardware issues

### Brains4Drones Robotics Internship

May-August 2022 (Plano, Texas)

- Created **automatic panorama stitcher** to make depth maps through OpenCV and C++ based on drone footage making use of Optical Flow to capture the Motion Parallax effect **replacing the \$200 LIDAR module** on product
- Developed **TensorFlow computer vision algorithms** to identify damaged electrical poles and wildfire areas trained on internal dataset collected by company
- Scripted a **GUI application in JavaScript** for line workers to view footage, automatically run panorama stitcher algorithm as footage is collected, contain zooming features to identify specific areas of interest, and execute TensorFlow based computer vision algorithms to identify electricity poles and wildfire areas

## Volunteer Experience

### Lead Counselor at CATALYST Summer Camp

July 2023

- Coordinated robotics lectures for **48 marginalized high schoolers** in the greater New York area
- Managed VEX Robotics Inventory composed of robot parts and game pieces
- Devised additional activities focused teaching search algorithms and robot learning principles
- Coordinated final competition for students to show off their skill and newly learned knowledge

## Projects

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### DINK: Differently Initialized Q-Networks

January-May 2024

- Collaborated with team of two for final project of CS4756: Introduction to Robot Learning
- Coded a Deep Q-Network in Python from a public Atari dataset on open-source Space Invaders environment
- Established Deep Q-Networks performs better on more optimized base policies such as a DAgger trained policy compared to less optimal policies including a standard Behavior Cloning policy

### CritterWorld

August-December 2022

- Collaborated with one teammate for final project of CS 2112: Honors Data Structures
- Programmed a JavaFX project simulating critters with specific rules and game play logic
- Developed custom language and processing unit that interprets critter coding language to step simulator and update visuals in correspondence to defined rules

### Big Red//Hacks

November 2022

- Collaborated with team of four for Cornell Big Red//Hacks Hackathon

- Envisioned and built NFTTree as an open marketplace for users to grow trees via NFTs
- Engineered android application through Android Studio to simulate primary functions as mockup
- **Winner of Blockchain and Web Track sponsored by PI Network:**  
[<https://minepi.com/blog/university-hackathon-winners/>]

## Technical Skills

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- **Back-end Development Tools:** Python, Java, OCaml, MATLAB, Simulink, ROS C, C++, SQL
- **Front-end Development Tools:** Electron, HTML, CSS, JavaScript, Qt
- **Developer Tools:** Git, GitHub, VS Code, PyTorch, TensorFlow, OpenCV, SolidWorks, AutoCAD
- **Cloud Development Tools:** AWS, Azure, Google Cloud
- **Computer:** Linux, Windows, MacOS Microsoft Suite, Blender, CUDA, LLMs, Docker

## Prior to University

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### Allen High School

- Graduated from Allen High School in Allen, Texas with Rank of 12/1690 and weighted GPA of 4.6956
- Completed 16 AP Courses and 2 IB Courses earning the AP Scholar with Distinction Award
- Competed in robotics for **9 years** and as **Software Lead** in FIRST Robotics team 5417 Eagle Robotics for **4 years**
- Founded Eaglets club: Created and distributed cost-free robot kits for underprivileged students in Allen ISD; Held free Summer/Fall camp for 50+ elementary students at Allen ISD STEAM Center, which was free for low-income students; Taught software in both camps
- Won **FRC Dean's List Finalist Award** (Top 157 out of 97000 participating students worldwide, Top 5 in Texas and New Mexico): Individual honor given to exceptional students for leadership and dedication in STEM initiatives by FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition (FRC) [<https://frc-events.firstinspires.org/2021/awards?id=233>]
- \$1000 MathWorks Simulink Design Award won at BEST Robotics competition in 2017:  
[<https://blogs.mathworks.com/student-lounge/2022/03/04/sibling-duo-share-how-participating-in-student-competitions-drive-interest-in-stem-careers/>]