Ryan Diaz

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Education

Rice University — Aug. 2025 – Present
Doctor of Philosophy, Computer Science — *Houston, TX*

University of Minnesota, Twin Cities — Sep. 2021 – May 2025
Bachelor of Science, Computer Science and Mathematics — *Minneapolis, MN*

- GPA: 4.0 / 4.0, University Honors Program
- **Relevant Coursework:** Deep Learning for Robot Manipulation, Machine Learning, Data Analysis, Computer Vision, Natural Language Processing, Stochastic Processes, Artificial Intelligence, Linear Algebra, Probability and Statistics

Research Experience

Human-Centered AI and Robotics Group, Rice University — Aug. 2025 – Present
Graduate Researcher, Advised by Prof. Vaibhav Unhelkar — *Houston, TX*

Robotics: Perception and Manipulation Lab, University of Minnesota, Twin Cities — Dec. 2022 – May 2025
Undergraduate Researcher, Advised by Prof. Karthik Desingh — *Minneapolis, MN*

- Trained robotic manipulation policies using behavior cloning with image and force-torque data on a contact-rich peg-in-hole insertion task. [Project Page]
- Evaluated robustness of 8 pretrained vision encoders in a novel 6-DoF bimanual peg-in-hole insertion task with respect to peg/hole shape and grasp variations. [Project Page]
- Leveraged the Blender Python API to programmatically generate large-scale datasets of cap and bottle geometries that vary widely in size and shape. [Project Page]

CERL Lab, Washington University in St. Louis — May 2024 – Aug. 2024
Undergraduate Researcher (NSF REU), Advised by Prof. Yevgeniy Vorobeychik — *St. Louis, MO*

- Utilized reinforcement learning and imitation learning algorithms with image inputs to teach a simulated autonomous vehicle to maneuver around static obstacles in its path. [Project Page]
- Implemented a system of data collection in the CARLA simulation, automatically annotating over 1000 images for object detection model training.
- Constructed a ROS node to deploy trained object detection models on a real-world autonomous agent in a scaled-down urban environment.

Publications

Conference Publications

C1. Chahyon Ku, Carl Winge, **Ryan Diaz**, Wentao Yuan, and Karthik Desingh, "Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning," in *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

Peer-Reviewed Workshop Papers

W1. **Ryan Diaz**, Adam Imdieke, Vivek Veeriah, and Karthik Desingh, "AugInsert: Learning Robust Visual-Force Policies via Data Augmentation for Object Assembly Tasks", in *Beyond Pick and Place Workshop @ ICRA*, 2025.

W2. Chahyon Ku, Carl Winge, **Ryan Diaz**, Wentao Yuan, and Karthik Desingh, "Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning," in *2nd Pretraining for Robot Learning (PRL) Workshop @ Conference on Robot Learning (CoRL)*, 2023.

Presentations

Poster: WashU STEM Poster Palooza — Aug. 2024
"Vision-Based Algorithms for Obstacle Detection and Avoidance in Autonomous Vehicles" — *St. Louis, MO*

Video: UMN Undergraduate Research Symposium — Dec. 2023
"Augmenting a Dual-Arm Contact-Rich Robotic Manipulation Task with Force-Torque Data" — *Minneapolis, MN*

Poster: UMN Summer Undergraduate Research Expo — Aug. 2023
"Imitation Learning for Spatio-Geometry Driven Assembly Task with Dual-Arm Manipulator" — *Minneapolis, MN*

Poster: UMN Undergraduate Research Symposium — Apr. 2023
"Large-Scale Object Generation for Learning Robotic Manipulation Tasks" — *Minneapolis, MN*

Teaching Experience

CSCI 4521: Applied Machine Learning — Spring 2025
Undergraduate Teaching Assistant — *University of Minnesota, Twin Cities*

MATH 5652: Introduction to Stochastic Processes — Spring 2025
Undergraduate Paper Grader — *University of Minnesota, Twin Cities*

CSCI 2033: Elementary Computational Linear Algebra — Spring 2023, Fall 2023, Fall 2024
Undergraduate Teaching Assistant — *University of Minnesota, Twin Cities*

CSCI 4511W: Introduction to Artificial Intelligence — Spring 2024
Undergraduate Teaching Assistant — *University of Minnesota, Twin Cities*

CSCI 1933: Introduction to Algorithms and Data Structures — Summer 2023
Undergraduate Teaching Assistant — *University of Minnesota, Twin Cities*

UMN Taylor Tutoring Center — Fall 2022
Undergraduate Peer Tutor — *University of Minnesota, Twin Cities*

Academic Service

Conference Reviewer
ICRA (2025), IROS (2025)

Undergraduate Peer Reviewer
Minnesota Undergraduate Research and Academic Journal (MURAJ) 2024-2025

Awards and Honors

CRA Outstanding Undergraduate Researcher Award (Honorable Mention) — Jan. 2025
UMN Undergraduate Research Opportunities Program (UROP) Award (x2) — Aug. 2023 – Aug. 2024
UMN College of Science and Engineering Dean's List (x7) — Dec. 2021 – Dec. 2024
UMN Prof. Hans H. Dalaker Mathematics Scholarship Award — Jun. 2024
UMN Hopper-Dean Foundation Computer Science Scholarship Award — Jun. 2024
UMN Ella Thorp Mathematics Scholarship Award — May 2023
UMN Undergraduate Research Scholarship (URS) Award — Jan. 2023

Technical Skills

Languages: Python, Java, C, C++, JavaScript, HTML, MATLAB, Bash, LaTeX
Libraries: PyTorch, Tensorflow, OpenCV, NumPy, ROS, Transformers (HuggingFace), MuJoCo
Software: Git, Linux, Blender