# Ethan Chun

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## Education

**Massachusetts Institute of Technology** — Cambridge, Massachusetts
Candidate for Masters of Engineering in Artificial Intelligence — 2024 - 2025
GPA: 5.0 / 5.0

**Massachusetts Institute of Technology** — Cambridge, Massachusetts
Bachelor of Science in Artificial Intelligence and Decision Making (Course 6-4) — 2020 – 2024
GPA: 5.0 / 5.0

## Publications

[1] **E. Chun**, Y. Du, A. Simeonov, T. Lozano-Perez, and L. Kaelbling, "Local neural descriptor fields: Locally conditioned object representations for manipulation," *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023.

[2] T. Shu, C. Shallal, **E. Chun**, A. Shah, A. Bu, D. Levine, S. H. Yeon, M. Carney, H. Song, T.-H. Hsieh, and H. M. Herr, "Modulation of prosthetic ankle plantarflexion through direct myoelectric control of a subject-optimized neuromuscular model," *IEEE Robotics and Automation Letters*, 2022.

## Experience

**MIT Biomimetic Robotics Lab — Dr. Sang-bae Kim** — Cambridge, Massachusetts
*Research Assistant, Robotic Manipulation and 3D Perception* — *Jan. 2023 — Present*

- Designed new neural network training pipeline for polyurethane based fingertip sensor, enabling time-dependant inference.
- Designed, implemented, validated, and submitted novel grasp approach architecture to predict potential robotic grasping directions from raw point cloud data using a variation of the PointNet++ architecture.
- Investigated deep representations for robotic manipulation including tiny view conditioned latent diffusion models and neural radiance fields.

**Boston Dynamics AI Institute** — Cambridge, Massachusetts
*Research Intern, Watch Understand Do* — *Jan. 2024*

- Built ROS2 interfaces to allow communication with Spot's PTZ camera.
- Built visualization utilities to allow convenient visualization objects in ROS2's RViz visualizer.

**Learning and Intelligent Systems — Dr. Tomás Lozano-Pérez and Dr. Leslie Pack Kaelbling** — Cambridge, Massachusetts
*Undergraduate Researcher, Vision-based Robotic Manipulation* — *Dec. 2021 — June. 2023*

- Designed, implemented, and published Local Neural Descriptor Fields – a novel framework using latent embeddings from Convolutional Occupancy Networks to enable robust robotic grasping of household objects
- Used Pytorch, Pybullet, and a Franka Panda robot to develop model architecture, data loading, data visualization systems, and a novel distance-based contrastive loss function.

**Biomechatronics Group — Dr. Hugh Herr** — Cambridge, Massachusetts
*Undergraduate Researcher, Embedded Systems and Experiments* — *Mar. 2021 – Jan. 2023*

- Utilized a novel EMG control paradigm and custom powered prosthetic to restore natural gait biomechanics for a unilateral transtibial amputee and several unilateral transfemoral amputees.
- Implemented robotics control stack in C++, including communications drivers (I2C, SPI, CAN) and integrated logger.

## Selected Projects

**Novel View Synthesis from Single Images with Tiny Latent Diffusion Models**

- Built tiny latent diffusion models to generate novel views given a single conditioning image and relative camera transform.
- Demonstrated training times of less than two hours, allowing potential integration of LDMs into conventional robotics pipelines.

**ChessBot: A Single View Perception and Manipulation System for Robotic Chess**
*Winner of a 2022 Outstanding Project Award in Russ Tedrake's Robotic Manipulation Course*

- Created a chess playing robot in Drake using ICP and RANSAC to determine piece positions from a single depth camera image.
- Engineered simulation environment to ensure robust testing of perception algorithm.

## Skills

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| **Tools** | PyTorch, Numpy, Pybullet, MATLAB, Git, Embedded Linux, SolidWorks |
| **Languages** | Python, C/C++, RISC-V Assembly, TypeScript |
| **Relevant Coursework** | Algorithms, Machine Learning, Inverse Graphics, Real Analysis, Abstract Algebra, Probability Theory |