Patrick Rim

patrick.rim@yale.edu patrickqrim.github.io linkedin.com/in/patrickrim

Research Interests

Building embodied AI agents with multimodal {vision + range/language} perception for 3D tasks {reconstruction + generation}. Adaptive and robust sensor fusion {camera + lidar/radar} in challenging and dynamic real-world settings {continual + unsupervised}.

Education

Yale University 2024 – Present
Ph.D. in Computer Science
Yale Vision Lab | Advisor: Prof. Alex Wong | GPA: 4.0/4.0

Caltech 2020 – 2024
B.S. in Computer Science, Minor in Information and Data Sciences
GPA: 4.3/4.3 (Best Academic Record in Computer Science)

Industry Experience

Meta Reality Labs, Research Scientist Intern May 2025 – Present
Mentors: Kun He, Shoou-I Yu
- Led the creation of SHOW3D, a massive in-the-wild hand-object interaction dataset.
- Developed a novel ego-exo pipeline for accurate 3D hand-object pose estimation with limited views. Lead author of paper (submitted to CVPR 2026) describing our mobile capture system, automatic annotation, and applications to robotics and teleoperation.

Squarepoint Capital, Quantitative Research Intern Jun 2023 – Sep 2023
- Market structure analysis to find predictive factors using statistical and ML methods.

Airstrafe Interactive, Software Engineering Intern Mar 2023 – Jun 2023
- Probabilistic decision making model for game AI agents with reasoning capabilities.

Selected Publications

"ProtoDepth: Unsupervised Continual Depth Completion with Prototypes"
P. Rim, H. Park, S. Gangopadhyay, Z. Zeng, Y. Chung, A. Wong.
IEEE/CVF Computer Vision and Pattern Recognition **(CVPR)**, 2025.

"ETA: Energy-based Test-time Adaptation for Depth Completion"
Y. Chung*, H. Park*, **P. Rim***, X. Zhang, J. He, Z. Zeng, S. Cicek, B. Hong, et al.
(*equal contribution)
International Conference on Computer Vision **(ICCV)**, 2025.

"Extending Foundational Monocular Depth Estimators to Fisheye Cameras with Calibration Tokens"
S. Gangopadhyay, J. Kim, X. Chen, **P. Rim**, H. Park, A. Wong.
International Conference on Computer Vision **(ICCV)**, 2025.

"SHOW3D: Capturing Scenes of 3D Hands and Objects in the Wild"
P. Rim, K. Harris, B. Copple, S. Han, X. Xie, I. Shugurov, S. An, H. Wen, et al.
International Conference on Computer Vision Workshop **(ICCVW)**, 2025.

"SparseFusion: Fusing Multi-Modal Sparse Representations for Multi-Sensor 3D Object Detection"
Y. Xie, C. Xu, M. Rakotosaona, **P. Rim**, F. Tombari, K. Keutzer, M. Tomizuka, W. Zhan.
International Conference on Computer Vision **(ICCV)**, 2023.

"Quadric Representations for LiDAR Odometry, Mapping and Localization"
C. Xia, C. Xu, **P. Rim**, M. Ding, N. Zheng, K. Keutzer, M. Tomizuka, W. Zhan.
IEEE Robotics and Automation Letters **(RA-L)**, 2023.

"Radar-Guided Polynomial Fitting for Metric Depth Estimation"
P. Rim, H. Park, V. Ezhov, J. Moon, A. Wong, *Under Review at CVPR 2026.*

"Radar-Camera 3D Hand Pose Estimation from Ego and Exo Views"
P. Rim, D. Hunt, T. Li, I. Diaz, X. Xie, M. Pajic, A. Wong, *Under Review at CVPR 2026.*

"Iris: Integrating Language into Diffusion-based Monocular Depth Estimation"
Z. Zeng, J. Ni, D. Wang, **P. Rim**, Y. Chung, F. Yang, B. Hong, A. Wong.
New England Computer Vision (NECV) Workshop, 2025. **(Oral)**

"ODE-GS: Latent ODEs for Dynamic Scene Extrapolation with 3D Gaussian Splatting"
D. Wang, **P. Rim**, T. Tian, A. Wong, G. Sundaramoorthi, *Under Review at ICLR 2026.*

"Unsupervised Depth Completion via Occluded Region Completion as Supervision"
H. Park, R. Chen, **P. Rim**, D. Lao, A. Wong, *Under Review at ICLR 2026.*

Academic Experience

Yale Vision Lab Aug 2024 – Present
Advisor: Prof. Alex Wong
- Adaptive efficient 3D vision; multimodal perception, reconstruction, and generation.

Berkeley AI Research (BAIR) Aug 2022 – Jun 2024
Advisors: Dr. Wei Zhan, Prof. Kurt Keutzer
- Multi-sensor 3D object detection, joint point cloud segmentation and generation.

Caltech, Vision and Learning May 2022 – Jun 2024
Advisors: Prof. Yisong Yue, Prof. Jennifer J. Sun
- Diffusion models for conditional animal trajectory generation, Interpretable AI.

Honors & Awards

Yale Computer Science "Rising Star" Award	2025
Graduate Nathan Hale Fellowship	2024
Henry Ford II Scholar Award	2023
Jack E. Froehlich Memorial Award Nominee	2023
Marcella Bonsall SURF Fellowship	2022
George W. Housner Fund Recipient	2021, 2022
William Hassenzahl Family SURF Fellowship	2021
Hixon Prize for Writing Nominee	2021
1st Place, AI Hacks Hackathon at UPenn	2020
Top 5 Overall Hack, YHack at Yale	2020
"Best Use of Google Cloud" Award	2020
"Facebook: Building Community" Award	2020
National Merit Scholarship Recipient	2020

Teaching Experience

Head Instructor (CS 12: Computer Vision for Research) 2022 – 2023

- Independently designed and taught a term-long course that provides students with a practical and theoretical foundation in computer vision.
- Covered fundamental topics and advanced topics such as transformers, diffusion models, and geometric 3D vision, drawing from my own research.
- Taught 23 total students, including undergraduate and graduate students.[1]

Head TA (First-Year Success Research Institute) Summer 2022

- Collaboratively designed a research project for FSRI (First-Year Success Research Institute) at Caltech, a DEI (Diversity, Equity, and Inclusion) program. Work included creating mini-projects and providing in-person help to students for 4-6 hours a week.
- Developed machine learning curriculum and assisted students with incorporating computer vision into their robotics projects.

Head TA – Online (CS 2, CS 3, CS 24) 2021 – 2023

- Worked as TA for CS 2 (Data Structures), CS 3 (Software Design), and CS 24 (Computing Systems) in the fall, winter, and spring terms respectively.
- Promoted to Head TA of Online Platform role for all three courses in 2022, where I was in charge of managing a 24/7 online Q&A-style teaching platform, in addition to holding 4-6 hours of Office Hours per week.

Leadership & Service

New England Computer Vision Workshop, Co-organizer Nov 2024

CVPR, ICCV, ECCV, NeurIPS, ICLR, Reviewer 2022 – Present

[1] Selected student endorsements:

- "I think you have made excellent video lectures and you are very good at explaining subjects clearly and concisely."
- "The lectures have been very comprehensive and helpful. Thanks for designing a great course!"

IEEE Transactions on Image Processing (TIP), Reviewer 2025 – Present
Quantitative Finance at Caltech, Head of ML Research 2022 – 2024
Caltech Deans Office, Peer Academic Coach 2022 – 2024
Caltech Course Ombuds Program, Ompudsperson 2020 – 2022
Southern California Science Olympiad, Treasurer 2020 – 2021

Invited Talks & Seminars

Adapting 3D Reconstruction Models on the Fly, From Test-Time Adaptation to Continual Learning Sep 2025
NSF AI Institute for Edge Computing (Athena) Seminar Series

2D to 3D Generation — What's Next? Mar 2025 – May 2025
Yale Computer Science x Biomedical Engineering

Adaptive, Efficient, and Robust 3D Vision Jan 2025
NYC Computer Vision Day 2025

Unsupervised Continual Depth Completion with Prototypes Nov 2024
The 8th New England Computer Vision (NECV) Workshop

Efficient 3D Perception Mar 2023
Berkeley Artificial Intelligence Labs

CaltechFN: Distorted and Partially Occluded Digits Dec 2022
Oral Presentation at ACCV 2022

Sentiment Analysis of Political Ad Videos Oct 2022
Caltech SFP Fall Seminar

Identifying the Pre-Main Sequence with t-SNE Jun 2022
Poster at 240th Meeting of the American Astronomical Society

Dimensionality Reduction to Find a New Galaxy Regime Oct 2021
Caltech SFP Fall Seminar

Rethinking Galaxy Evolution with Unsupervised ML Aug 2021
Technical University of Denmark