# Patrick Rim

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| **Research Interests** | Embodied AI with multimodal sensing {vision + language} for 3D tasks {perception + reconstruction}. Robust representations for sensor fusion {camera + lidar/radar} in challenging and dynamic settings {unsupervised + continual}. |

## Education

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

**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**
Mentors: Kun He, Shoou-I Yu  May 2025 – Aug 2025
— *Exciting things to come!*

## Research Experience

**Yale Vision Lab**
Advisor: Prof. Alex Wong  Aug 2024 – Present
— 3D computer vision; multimodal perception, reconstruction, and generation

**MSC Lab, UC Berkeley**
Advisors: Dr. Wei Zhan, Prof. Kurt Keutzer  Aug 2022 – Jun 2024
— Multi-sensor 3D object detection, point-cloud segmentation and generation

**Yue Lab, Caltech**
Advisors: Prof. Yisong Yue, Prof. Jennifer J Sun  May 2022 – Jun 2024
— Diffusion models for conditional animal trajectory generation, AI for science

## 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.

"SparseFusion: Fusing Multi-Modal Sparse Representations for Multi-Sensor 3D Object Detection"
Y. Xie, C. Xu, M. Rakotosaona, **P. Rim**, F. Tombari, K. Keutzer, et al.
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.

"CaltechFN: Distorted and Partially Occluded Digits"
**P. Rim**, S. Saha, M. Rim.
Proceedings of Asian Conference on Computer Vision (**ACCV**), 2022.

"UnCLe: Unsupervised Continual Learning of Depth Completion"
S. Gangopadhyay, X. Chen, M. Chu, **P. Rim**, H. Park, A. Wong.
*arXiv Preprint*, 2024.

"OcCom's Razor: Unsupervised Depth Completion by Learning from Occlusions"
H. Park, R. Chen, **P. Rim**, C. Moon, A. Wong.
*In Submission*, 2025.

"PriorDiffusion: Leverage Language Prior in Diffusion Models for Monocular Depth Estimation"
Z. Zeng, J. Ni, D. Wang, **P. Rim**, Y. Chung, F. Yang, B. Hong, A. Wong.
*In Submission*, 2025.

"ETA: Energy-based Test-time Adaptation for Depth Completion"
Y. Chung, H. Park, **P. Rim**, J. He, Z. Zeng, S. Cicek, B. Hong, A. Wong.
*In Submission*, 2025.

<span style="color:blue">Prev. Industry Experience</span>

**Squarepoint Capital,** Quantitative Research Intern            Summer 2023

— Constructed and analyzed database of price, volatility, volume, and spreads of U.S. natural gas and power futures.
— Performed market structure analysis to find predictive factors using statistical and deep learning methods.

**Airstrafe Interactive,** Software Engineering Intern            Spring 2023

— Designed and integrated dynamic probability models to build new AI and logic systems using C++ and Unity.
— Created inverse kinematics system using quaternions and 3D math for realistic movement and rotation.

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| **Honors and Awards** | 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 generative modeling and 3D vision, drawing from my own research.
— Taught 23 total students, including undergraduate and graduate students.[1]
— Updated course to cover diffusion models for image generation in 2024.

**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 of Online, TA (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 of Online (Ticketing) role in 2022, where I was in charge of managing a 24/7 online help platform, in addition to holding 4-6 hours of Office Hours per week.

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[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!"

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| **Service and Leadership** | **New England Computer Vision Workshop**, Co-organizer | 2024 |
| | **CVPR**, Reviewer | 2024 |
| | **NeurIPS**, Reviewer | 2022 – 2024 |
| | **Deans Office Tutoring Program**, Tutor | 2022 – 2024 |
| | **Quantitative Finance Club**, Head of ML Research | 2022 – 2024 |
| | **Course Ombuds Program**, Ompudsperson | 2020 – 2022 |
| | **Southern California Science Olympiad**, Treasurer | 2020 – 2021 |

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| **Talks and Presentations** | **Unsupervised Continual Depth Completion with Prototypes** <br> The 8th New England Computer Vision (NECV) Workshop | Nov 2024 |
| | **Efficient 3D Vision** <br> Berkeley Artificial Intelligence Labs | Mar 2023 |
| | **CaltechFN: Distorted and Partially Occluded Digits** <br> Oral Presentation at ACCV 2022 | Dec 2022 |
| | **Sentiment Analysis of Political Ad Videos** <br> Caltech SFP Fall Seminar Day | Oct 2022 |
| | **Identifying the Pre-Main Sequence with t-SNE** <br> Poster at 240th Meeting of the American Astronomical Society | Jun 2022 |
| | **Dimensionality Reduction to Find a New Galaxy Regime** <br> Caltech SFP Fall Seminar Day | Oct 2021 |
| | **Rethinking Galaxy Evolution with Unsupervised Learning** <br> Technical University of Denmark | Aug 2021 |