

# Neehar Peri

neeharperi.com

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## EDUCATION

### Ph.D in Robotics, Carnegie Mellon University

*Scaling Open-World 3D Perception*

Expected May 2026

<http://www.neeharperi.com/UnderReview>

### M.S in Robotics, Carnegie Mellon University

*Long-Tailed 3D Detection via Multi-Modal Fusion*

May 2023

### B.S. in Computer Engineering, University of Maryland - College Park

*QUEST Honors Program*

May 2021

## WORK EXPERIENCE

### Carnegie Mellon University, Pittsburgh, PA, Research Assistant

Apr 2020 – Present

- Led research on 3D object detection, multi-object tracking, motion forecasting, and multi-agent planning for embodied perception
- Advisor: Deva Ramanan

### RAI Institute, Boston, MA, Research Scientist Intern

Jun 2025 – Present

- Benchmarked SLAM and SfM methods for UMI-style data collection with motion capture data
- Leading research on policy learning with multi-modal representations (e.g. depth, force, tactile) for manipulation

### NVIDIA, Pittsburgh, PA, Research Scientist Intern

Jan 2024 – Dec 2024

- Led research on persistent 3D object detection in-the-wild
- Built GNN-based tracker that outperforms production system by 5% HOTA and achieves a 10x speedup

### MUKH Technologies, College Park, MD, Research Scientist Intern

Aug 2020 – May 2023

- Led research on improving thermal-to-visible face synthesis for zero-shot identification
- Built robust face verification pipelines for multi-spectral data streams

### Argo AI, Pittsburgh, PA, Research Scientist Intern

May 2021 – Oct 2022

- Developed end-to-end 3D object detection and forecasting pipeline from LiDAR point clouds
- Implemented novel metrics that jointly evaluate detection and forecasting accuracy

### University of Maryland, College Park, MD, Research Assistant

May 2018 – May 2021

- Conducted research in unsupervised traffic anomaly detection and discriminative representation learning for vehicle re-id
- Led research in defending against clean-label adversarial poisoning attacks
- Established novel method for encoding human preferences in revenue maximizing auction design
- Advisors: Rama Chellappa & John P. Dickerson

## AWARDS

Name	Institution	Distinction	Year
NSF Graduate Research Fellowship	CMU	National	2023
Maryland Undergraduate Researcher of the Year	UMD	University	2021
Sujan Guha Memorial Best Senior Thesis Award	UMD	Department	2021
CRA Outstanding Undergraduate Researcher (Honorable Mention)	UMD	National	2021
Yurie & Jeong H. Kim Scholarship	UMD	Department	20{18,19,20}

## CONFERENCE PUBLICATIONS

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- MimicAgent: Learning Quadruped Skills via Text-to-Trajectory Generation  
*NP Parameswaran\*, LK Nayak\*, N Peri, D Ramanan* Under Review
- In-Context Learning with Multi-Modal LLMs for Few-Shot Object Detection  
*GR Gare\*, N Peri\*, M Popov, SP Jain, J Galeotti, D Ramanan* Under Review
- UniFlow: Zero-Shot LiDAR Scene Flow for Autonomous Driving  
*S Li, Q Zhang, I Khatri, K Vedder, E Eaton, D Ramanan, N Peri* Under Review
- RefAV: Towards Planning-Centric Scenario Mining  
*C Davidson, D Ramanan, N Peri* CVPR 2026
- RF-DETR: Neural Architecture Search for Real-Time Detection Transformers  
*I Robinson, P Robicheaux, M Popov, D Ramanan, N Peri* ICLR 2026
- Roboflow100-VL: A Multi-Domain Object Detection Benchmark for Vision-Language Models  
*P Robicheaux\*, M Popov\*, A Madan, I Robinson, J Nelson, D Ramanan, N Peri* NeurIPS 2025
- MonoFusion: Sparse-View 4D Reconstruction via Monocular Fusion  
*Z Wang, J Tan, T Khurana\*, N Peri\*, D Ramanan* ICCV 2025
- Towards Learning to Complete Anything in LiDAR  
*A Tacmaz, C Saltori, N Peri, T Meinhardt, RD Lutio, L Leal-Taixe, A Osep* ICML 2025
- Planning with Adaptive World Models for Autonomous Driving  
*AB Vasudevan, N Peri, J Schneider, D Ramanan* ICRA 2025
- Neural Eulerian Scene Flow Fields  
*K Vedder, N Peri, I Khatri, S Li, E Eaton, M Kocamaz, Y Wang, Z Yu, D Ramanan, J Pehserl* ICLR 2025
- Revisiting Few-Shot Object Detection with Vision-Language Models  
*A Madan\*, N Peri\*, S Kong\*, D Ramanan\** NeurIPS 2024
- Shelf-Supervised Cross-Modal Pre-Training for 3D Object Detection  
*M Khurana\*, N Peri\*, J Hays, D Ramanan* CoRL 2024
- I Can't Believe It's Not Scene Flow!  
*I Khatri\*, K Vedder\*, N Peri, D Ramanan, J Hays* ECCV 2024
- Better Call SAL: Towards Learning to Segment Anything in LiDAR  
*A Osep\*, T Meinhardt\*, F Ferroni, N Peri, D Ramanan, L Leal-Taixe* ECCV 2024
- ZeroFlow: Scaling Scene Flow via Distillation  
*K Vedder, N Peri, N Chodosh, I Khatri, E Eaton, D Jayaraman, Y Liu, D Ramanan, J Hays* ICLR 2024
- Towards Long-Tailed 3D Detection  
*N Peri, A Dave, D Ramanan\*, S Kong\** CoRL 2022
- A Brief Survey of Person Recognition at a Distance  
*C Nalty\*, N Peri\*, J Gleason\*, CD Castillo, S Hu, T Bourlai, R Chellappa* ASILOMAR 2022
- Forecasting from LiDAR via Future Object Detection  
*N Peri, J Luieten, M Li, A Osep, L Leal-Taixe, D Ramanan* CVPR 2022
- Assessment of a Novel Virtual Environment for Examining Human Cognitive-Motor Performance during Execution of Action Sequences  
*AA Shaver\*, N Peri\*, R Mezebish, G Matthew, A Berson, C Gaskins, GP Davis, GE Katz, I Samuel, JA Reggia, J Purtilo, RJ Gentili* HCII 2022
- A Synthesis-Based Approach for Thermal-to-Visible Face Verification  
*N Peri, J Gleason, CD Castillo, T Bourlai, VM Patel, R Chellappa* FG 2021
- PreferenceNet: Encoding Human Preferences in Auction Design with Deep Learning  
*N Peri\*, MJ Curry\*, S Dooley, JP Dickerson* NeurIPS 2021
- The Devil is in the Details: Self-Supervised Attention for Vehicle Re-ID  
*P Khorramshahi\*, N Peri\*, JC Chen, R Chellappa* ECCV 2020
- A Dual Path Model with Adaptive Attention for Vehicle Re-ID  
*P Khorramshahi, A Kumar, N Peri, SS Rambhatla, JC Chen, R Chellappa* ICCV 2019<sup>††</sup>

## JOURNAL PUBLICATIONS

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- Long-Tailed 3D Detection via Multi-Modal Late Fusion  
*Y Ma\*, N Peri\*, A Dave, W Hua, D Ramanan, S Kong* Under Review
- Accelerating Image Recognition Using High Performance Computing  
*J Adams, JM Barton, R Chellappa, J Gabberty, J Gleason, S Hu, J Johnson, F Moor-Clingenpeel, B Oshiro, N Peri, D Richie, V To* ITEA 2023
- Data and Algorithms for End-to-End Thermal Spectrum Face Verification  
*T Bourlai, J Rose, S Mokalla, A Zabin, L Hornak, CB Nalty, N Peri, J Gleason, CD Castillo, VM Patel, R Chellappa* TBIOM 2023

## WORKSHOP PUBLICATIONS

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- QuickDraw: Fast Visualization, Analysis and Active Learning for Medical Image Segmentation  
*D Syomichev\*, P Gopinath\*, GL Wei, E Chang, I Gordon, A Seifu, R Pemmaraju\*, N Peri\*, J Purtalo\** HCII 2025
- Semi-Supervised Federated Multi-Organ Segmentation with Partial Labels  
*R Pemmaraju\*, N Peri\** AAPM 2024<sup>††</sup>
- An Empirical Analysis of Range for 3D Object Detection  
*N Peri, M Li, B Wilson, YX Wang, J Hays, D Ramanan* ICCV 2023<sup>††</sup>
- ReBound: An Open-Source 3D Bounding Box Annotation Tool for Active Learning  
*W Chen\*, A Edgley\*, R Hota\*, J Liu\*, E Schwartz\*, A Yizar\*, N Peri\*, J Purtalo\** CHI 2023<sup>†</sup>
- Deep  $k$ -NN Defense Against Clean-label Data Poisoning Attacks  
*N Peri\*, N Gupta\*, WR Huang\*, L Fowl, C Zhu, S Feizi, T Goldstein, JP Dickerson* ECCV 2020<sup>†</sup>
- Towards Real-Time Systems for Vehicle Re-ID, Multi-Camera Tracking, and Anomaly Detection  
*N Peri\*, P Khorramshahi\*, SS Rambhatla\*, V Shenoy, S Rawat, JC Chen, R Chellappa* CVPR 2020<sup>†</sup>
- Attention Driven Vehicle Re-ID and Unsupervised Anomaly Detection for Traffic Understanding  
*P Khorramshahi, N Peri, A Kumar, A Shah, R Chellappa* CVPR 2019<sup>†</sup>

\*Equal Contribution

\*Equal Supervision

<sup>†</sup>Selected for Spotlight Presentation

<sup>††</sup>Selected for Oral Presentation

## INVITED TALKS

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- Argoverse 2 Scenario Mining Challenge  
*Invited Talk: CVPR 2025, Workshop on Autonomous Driving* Jun 2025
- Foundational Few-Shot Object Detection Challenge  
*Invited Talk: CVPR 2025, Workshop on Visual Perception via Learning in an Open World* Jun 2025
- 3D Object Detection for Autonomous Vehicles  
*Guest Lecture: 16-825, Learning for 3D Vision* Apr 2025
- Towards Foundation Models for 3D Perception  
*Invited Talk: Carnegie Mellon University (FLAME Seminar & NeuroAI Seminar)* Mar 2025
- Image Processing from a Frequency Perspective  
*Guest Lecture: 16-720, Computer Vision* Feb 2025
- Long-Tailed 3D Detection via 2D Late Fusion  
*Invited Talk: ECCV 2024, Workshop on Vision-Centric Autonomous Driving* Oct 2024
- Shelf-Supervised Cross-Modal Pre-Training for 3D Object Detection  
*Invited Talk: ECCV 2024, Autonomous Vehicles meet Multimodal Foundation Models Workshop* Oct 2024
- Argoverse 2 End-to-End Forecasting Challenge  
*Invited Talk: CVPR 2024, Workshop on Autonomous Driving* Jun 2024
- Foundational Few-Shot Object Detection Challenge  
*Invited Talk: CVPR 2024, Workshop on Visual Perception via Learning in an Open World* Jun 2024
- 3D Object Detection for Autonomous Vehicles  
*Guest Lecture: 16-720, Computer Vision* Apr 2024
- Better Call SAL: Towards Learning to Segment Anything in LiDAR  
*Invited Talk: Stack AV* Apr 2024
- 3D Object Detection for Autonomous Vehicles  
*Guest Lecture: 16-825, Learning for 3D Vision* Apr 2024
- Long-Tailed 3D Object Detection via Multi-Modal Fusion  
*Invited Talk: Carnegie Mellon University (R-PAD Lab)* Jan 2024
- An Empirical Analysis of Range for 3D Object Detection  
*Invited Talk: ICCV 2023, Robustness and Reliability of Autonomous Vehicles in the Open-World* Oct 2023
- Argoverse 2 End-to-End Forecasting Challenge  
*Invited Talk: CVPR 2023, Workshop on Autonomous Driving* Jun 2023
- 3D Object Detection for Autonomous Vehicles  
*Guest Lecture: 16-825, Learning for 3D Vision* Mar 2023
- Image Processing and Convolutions  
*Guest Lecture: 16-720, Computer Vision* Sep 2022

- **How do Autonomous Vehicles See the World?** Aug 2022  
*Invited Talk: Carnegie Mellon University (RoboLaunch)*
- **Transformers for Vision** Apr 2022  
*Guest Lecture: 16-720, Computer Vision*
- **Training Convolutional Neural Networks** Apr 2022  
*Guest Lecture: 16-720, Computer Vision*
- **Metrics and Methods for Detection and Forecasting in Autonomous Vehicles** Apr 2022  
*Invited Talk: National Autonomous Vehicle Conference*

## MENTORSHIP

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Name	Institution	Year(s)	Project
Narayanan PP	CMU	2025 –	Text-to-policy for quadrupedal locomotion
Lucky Nayak	CMU	2025 –	Text-to-policy for quadrupedal locomotion
Shruti Jain	CMU	2025	Benchmarking spatial understanding in VLMs
Siyi Li	UPenn	2025 –	Zero-shot scene flow estimation via cross-domain generalization
Cainan Davidson	CMU	2024 –	Benchmarking scenario mining for autonomous vehicles
Guang-Lin Wei, Eric Chang, Padmini Gopinath, Ian Gordon, Amanuel Seifu, Daniel Syomichev	UMD	2024	CMSC435 software engineering capstone to build an <a href="#">active-learning framework</a> for medical image analysis
Zihan Wang	CMU → Berkeley PhD	2024 – 2025	Sparse-view dynamic reconstruction in-the-wild
Nina Johe, Aryan Kakadia, Muzzamil Khan, Morgan Ko, Josh Leeman, Max Son, Sashwat Venkatesh	UMD	2024	CMSC435 software engineering capstone to build an end-to-end platform for medical image analysis
Mehar Khurana	IIITD → CMU MSR	2023 – 2024	Shelf-supervised 3D object detection with vision-language models
Anish Madan	CMU → SkildAI	2022 – 2025	Few-shot multi-modal 2D detection with vision-language models
Andrew Shen	CMU → OpenAI	2022 – 2023	Benchmarking modular 3D perception stack for autonomous vehicles
Aminah Yizar, Andrew Edgley, Ezra Schwartz, Joshua Liu, Raunak Hota, Royce He, Wesley Chen	UMD	2022	CMSC435 software engineering capstone to build an <a href="#">active learning framework</a> to allow human-in-the-loop 3D object annotation
Christopher Nalty	MUKH → Oregon State PhD	2021 – 2022	Synthetic data augmentation for thermal-to-visible face verification
Aastha Senjalia, Andrew Vetter, Benjamin Namovicz, Cheyenne Montgomery, Ferzam Mohammad, Matthew Weinberg, Nicholas Revill	UMD	2021	CMSC435 software engineering capstone to build a <a href="#">visualization platform</a> for autonomous vehicle data. Project won People's Choice Award.

## SERVICE

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**Conference Reviewer:** NeurIPS, CVPR, AAAI, ICCV, ICLR, ECCV, ICRA

**Journal Reviewer:** IJCV, TPAMI

**Mentorship:** CMU AI Mentoring Program, QUEST Mentoring Program, CMU AI for Social Good Summit

**Organizer:** Visual Perception and Learning in an Open World, CMU Computer Vision Reading Group

**Masters Thesis Committee Member:** Bharath Raj, Anish Madan, Shen Zheng

**Other:** AUTOBOT & TRINITY Cluster Management, RISS Admissions Committee

## TEACHING EXPERIENCE

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**16-720**, Carnegie Mellon University, Robotics Institute, *Head Teaching Assistant*

- Managed team of teaching assistants to effectively coordinate course responsibilities
- Graded course projects and held office hours

*Spring 2022, Fall 2022*

**ENEE 244**, University of Maryland, ECE Department, *Undergraduate Teaching Fellow*

- Led Introduction to Digital Logic recitation for a discussion section of 15 students

*Spring 2019*