

# SEUNGCHAN KIM

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🏠 <https://seungchan-kim.github.io>

LinkedIn

Scholar

GitHub

## EDUCATION

<b>Carnegie Mellon University</b>	Pittsburgh, PA
Ph.D. Candidate at Robotics Institute	Sep 2020 - Present
Advisor: Sebastian Scherer	
<b>Brown University</b>	Providence, RI
M.S. in Computer Science	Sep 2019 - May 2020
B.S. in Applied Mathematics & Computer Science, <i>Magna Cum Laude</i>	Sep 2013 - May 2019
Advisors: George Konidaris, Michael Littman	

## RESEARCH EXPERIENCE

<b>CMU AirLab</b>	Pittsburgh, PA
Graduate Research Assistant	Sep 2020 - Present
• Research on autonomous robot exploration & navigation, open-set 3D semantic mapping, and multi-robot systems	
<b>Field AI</b>	Pittsburgh, PA
Robotics Research Intern	Sep 2025 - Dec 2025
• Research on semantic reasoning and world modeling for mobile manipulation	
<b>Brown University Intelligent Robot Lab</b>	Providence, RI
Undergraduate Research Assistant	Sep 2017 - May 2020
• Research on deep reinforcement learning	
<b>SEC Research Institute</b>	Seongnam, Korea
Signals Intelligence Researcher, ROK Army Sergeant	Sep 2015 - Jun 2017

## NEW PREPRINTS UNDER REVIEW

- [1] **RADSeg: Unleashing Parameter and Compute Efficient Zero-Shot Open-Vocabulary Segmentation Using Agglomerative Models**  
Omar Alama\*, Darshil Jariwala\*, Avigyan Bhattacharya\*, **Seungchan Kim**, Wenshan Wang, Sebastian Scherer  
*arXiv preprint arXiv:2511.19704 (2025). Under Review*

## JOURNAL PUBLICATIONS

- [1] **Multi-Robot Multi-Room Exploration with Geometric Cue Extraction and Circular Decomposition**  
**Seungchan Kim**, Micah Corah, John Keller, Graeme Best, Sebastian Scherer  
*IEEE Robotics and Automation Letters (RA-L) 2023*  
*Presentation at IEEE International Conference on Robotics and Automation (ICRA) 2024*
- [2] **Unsupervised Online Learning for Robotic Interestingness with Visual Memory**  
Chen Wang, Yuheng Qiu, Wenshan Wang, Yafei Hu, **Seungchan Kim**, Sebastian Scherer  
*IEEE Transactions on Robotics (T-RO) 2021*

## CONFERENCE PUBLICATIONS

- [1] **RAVEN: Resilient Aerial Navigation via Open-Set Semantic Memory and Behavior Adaptation**  
**Seungchan Kim**, Omar Alama, Dmytro Kurdydyk, John Keller, Nikhil Keetha, Wenshan Wang, Yonatan Bisk, Sebastian Scherer  
*IEEE International Conference on Robotics and Automation (ICRA) 2026*  
*IROS 2025 Active Perception Workshop, Best Paper Finalist (Spotlight Presentation)*
- [2] **MapExRL: Human-Inspired Indoor Exploration with Predicted Environment Context and Reinforcement Learning**  
Narek Harutyunyan\*, Brady Moon\*, **Seungchan Kim**, Cherie Ho, Adam Hung, Sebastian Scherer  
*International Conference on Advanced Robotics (ICAR) 2025*  
*ICRA 2025 Workshop on Structured Learning for Efficient, Reliable, and Transparent Robots*

- [3] **RayFronts: Open-Set Semantic Ray Frontiers for Online Scene Understanding and Exploration**  
Omar Alama, Avigyan Bhattacharya, Haoyang He, **Seungchan Kim**, Yuheng Qiu, Wenshan Wang, Cherie Ho, Nikhil Keetha, Sebastian Scherer  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025*  
*RSS 2025 Workshop on Semantic Reasoning and Goal Understanding in Robotics*  
*RSS 2025 Workshop on Learned Robot Representations*
- [4] **PIPE Planner: Pathwise Information Gain with Map Predictions for Indoor Robot Exploration**  
Seungjae Baek\*, Brady Moon\*, **Seungchan Kim\***, Muqing Cao, Cherie Ho, Sebastian Scherer, Jeong hwan Jeon  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025*  
(\*: Equal Contributions)
- [5] **MapEx: Indoor Structure Exploration with Probabilistic Information Gain from Global Map Predictions**  
Cherie Ho\*, **Seungchan Kim\***, Brady Moon, Aditya Parandekar, Narek Harutyunyan, Chen Wang, Katia Sycara, Graeme Best, Sebastian Scherer  
*IEEE International Conference on Robotics and Automation (ICRA) 2025*  
(\*: Equal Contributions)
- [6] **AirDet: Few-Shot Detection without Fine-tuning for Autonomous Exploration**  
Bowen Li, Chen Wang, Pranay Reddy, **Seungchan Kim**, Sebastian Scherer  
*European Conference on Computer Vision (ECCV) 2022*
- [7] **Robotic Interestingness via Human-Informed Few-Shot Object Detection**  
**Seungchan Kim**, Chen Wang, Bowen Li, Sebastian Scherer  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022*
- [8] **DeepMellow: Removing the Need for a Target Network in Deep Q-Learning**  
**Seungchan Kim**, Kavosh Asadi, Michael Littman, George Konidaris  
*International Joint Conference on Artificial Intelligence (IJCAI) 2019*  
*Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM) 2019*

## PREPRINTS, WORKSHOP PAPERS, EXTENDED ABSTRACTS

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- [1] **Toward General-Purpose Robots via Foundation Models: A Survey and Meta-Analysis**  
Yafei Hu\*, Quanting Xie\*, Vidhi Jain\*, Jonathan Francis, Jay Patrikar, Nikhil Keetha, **Seungchan Kim**, Yaqi Xie, Tianyi Zhang, Hao-Shu Fang, Shibo Zhao, Shayegan Omidshafiei, Dong-Ki Kim, Ali-akbar Agha-mohammadi, Katia Sycara, Matthew Johnson-Roberson, Dhruv Batra, Xiaolong Wang, Sebastian Scherer, Chen Wang, Zsolt Kira, Fei Xia, Yonatan Bisk  
*arXiv preprint arXiv:2312.08782 (2023)*
- [2] **Adaptive Temperature Tuning for Mellowmax in Deep Reinforcement Learning**  
**Seungchan Kim**, George Konidaris  
*NeurIPS 2019 Deep Reinforcement Learning Workshop*
- [3] **Combating the Compounding-Error Problem with a Multi-step Model**  
Kavosh Asadi, Dipendra Misra, **Seungchan Kim**, Michael Littman  
*arXiv preprint arXiv:1905.13320 (2019)*
- [4] **Removing the Target Network from Deep Q-Networks with the Mellowmax Operator**  
**Seungchan Kim**, Kavosh Asadi, Michael Littman, George Konidaris  
*International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2019*
- [5] **Using Computational Analysis of Behavior to Discover Developmental Change in Memory-Guided Attention Mechanisms in Childhood**  
Dima Amso, Lakshmi Govindarajan, Pankaj Gupta, Heidi Baumgartner, Andrew Lynn, Kelley Gunther, Diego Placido, Tarun Sharma, Vijay Veerabadran, Kalpit Thakkar, **Seungchan Kim**, Thomas Serre  
*PsyArXiv. doi:10.31234/osf.io/gq4rt*

## INVITED TALKS

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### AirStack Simulator and Applications: A Modular Autonomy Stack for Aerial Robotics

Guest Lecture, 16-667A Autonomous Air Vehicle Design and Development, CMU (Host: Sebastian Scherer)

Aug 2025

### Toward Real-Time Open-Vocabulary Semantic Mapping for Outdoor Robot Navigation

Korean-American Roboticists Association (KARA)

Jul 2025

### Spatial Reasoning and Semantic Representations for Intelligent Multi-Robot Exploration and Navigation

Artificial Intelligence for Robot Coordination at Scale (ARCS) Lab, CMU (Host: Jiaoyang Li)

Jul 2025

Resilient Intelligent Systems Lab (RISLab), CMU (Host: Wennie Tabib)

Nov 2024

### MapEx: Indoor Structure Exploration with Probabilistic Information Gain from Global Map Predictions

Korean-American Roboticists Association (KARA)

May 2025

### An Alternative Softmax Operator for Deep Reinforcement Learning

Machine Intelligence Community (MIC) Conference, Boston University

Sep 2019

## ADVISING & MENTORING

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### Master's Research

Seungjae Baek (UNIST M.S. in AI)

Aug 2024 - Feb 2025

### Undergraduate Research

Dmytro Kurdydyk (Davidson College; CMU RISS)

Jun 2025 - Present

Narek Harutyunyan (Brown University; CMU RISS)

Jun 2024 - Aug 2024

Aditya Parandekar (BITS Pilani - Goa)

Jun 2023 - Dec 2023

### Master's Thesis Committee

Jonathan Lee (CMU M.S. in Robotics)

2025

## TEACHING

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### Teaching Assistant

CMU 16-711 Kinematics, Dynamics, Control

Spring 2023

CMU 16-833 Robot Localization and Mapping

Spring 2022

Brown CSCI1430 Computer Vision

Spring 2019

Brown CSCI0040 Intro to Scientific Computing and Problem Solving

Spring 2015

Brown ENGN0040 Dynamics and Vibrations

Spring 2015

## SERVICE & OUTREACH

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### Workshop & Seminar Organization

Tartan Planning Series

Mar 2023 - May 2023

### Reviewer

International Journal of Robotics Research (IJRR) 2023, 2025

IEEE Transactions on Automation Science and Engineering (T-ASE) 2025

IEEE Robotics and Automation Letters (RA-L) 2022, 2023, 2024, 2025, 2026

IEEE International Conference on Robotics and Automation (ICRA) 2023, 2025, 2026

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024, 2025

IEEE International Conference on Automation Science and Engineering (CASE) 2025

IEEE International Symposium on Multi-Robot & Multi-Agent Systems (MRS) 2023

International Conference on Advanced Robotics (ICAR) 2025

International Conference on Learning Representations (ICLR) 2021, 2023

Neural Information Processing Systems (NeurIPS) 2021, 2022

AAAI Conference on Artificial Intelligence (AAAI) 2021

International Conference on Machine Learning (ICML) 2020

### Program Mentor

CMU Paths to AI Research

Fall 2025

CMU AI Undergraduate Mentoring

Fall 2020 - Spring 2021

CMU SCS Graduate Application Support

Fall 2020

## AWARDS & HONORS

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<b>Outstanding Best Paper Award Finalist, IROS 2025 Active Perception Workshop</b>	Oct 2025
<b>Selected Participant, IEEE ICRA 2025 Doctoral Consortium</b>	Apr 2025
<b>CMU GSA/Provost Conference Funding</b>	Mar 2025
<b>IEEE ICRA 2025 RAS Travel Grant</b>	Feb 2025
<b>Karen T. Romer Undergraduate Teaching and Research Awards</b>	Mar 2018

## MEDIA COVERAGE

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<b>Autonomous Aerial Robots Communicate, Prioritize Rooms in Multiroom Exploration</b>	Jul 2024
Marylee Williams, CMU School of Computer Science News	