

# SEUNGCHAN KIM

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## EDUCATION

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**Carnegie Mellon University** Pittsburgh, PA  
Ph.D. Candidate at Robotics Institute Sep 2020 - Present  
Advisor: Sebastian Scherer

**Brown University** Providence, RI  
M.S. in Computer Science Sep 2019 - May 2020  
B.S. in Applied Mathematics & Computer Science, *Magna Cum Laude* Sep 2013 - May 2019  
Advisors: George Konidaris, Michael Littman

## RESEARCH EXPERIENCE

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**Field AI**, Robotics Research Intern Sep 2025 - Dec 2025

**CMU AirLab**, Graduate Research Assistant Sep 2020 - Present

**Brown University Intelligent Robot Lab**, Undergraduate Researcher Sep 2017 - May 2020

**SEC Research Institute**, Signals Intelligence Researcher, ROK Army Sergeant Sep 2015 - Jun 2017

## NEW PREPRINTS UNDER REVIEW

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- [1] **PRoID: Predicting Rate of Information Delivery in Multi-Robot Exploration and Relaying**  
**Seungchan Kim**, Seungjae Baek, Micah Corah, Graeme Best, Brady Moon, Sebastian Scherer  
*arXiv preprint arXiv:2604.10433 (2026). Under Review.*

## JOURNAL PUBLICATIONS

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- [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

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- [1] **SuperMap: A Spatio-Temporal SLAM System for Visual-Language Navigation**  
Shibo Zhao\*, Guofei Chen\*, Honghao Zhu, Zhiheng Li, Changwei Yao, Nader Zantout, **Seungchan Kim**,  
Wenshan Wang, Ji Zhang, Sebastian Scherer.  
*Robotics: Science and Systems (RSS) 2026*
- [2] **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  
*IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2026 Findings*
- [3] **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 (Oral Presentation)*  
*IROS 2025 Active Perception Workshop, Best Paper Finalist (Spotlight Presentation)*

- [4] **MapExRL: Human-Inspired Indoor Exploration with Predicted Environment Context and Reinforcement Learning**  
Narek Harutyunyan\*, Brady Moon\*, **Seungchan Kim**, Cherie Ho, Adam Hung, Sebastian Scherer  
*IEEE International Conference on Advanced Robotics (ICAR) 2025*  
*ICRA 2025 Workshop on Structured Learning for Efficient, Reliable, and Transparent Robots*
- [5] **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*
- [6] **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)
- [7] **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)
- [8] **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*
- [9] **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*
- [10] **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,

## INVITED TALKS

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### **3D Representations for Robotics: Geometry, Efficiency, and Semantics**

Guest Lecture, CS479: Machine Learning for 3D Data @ KAIST (Host: Minhyuk Sung)

May 2026

### **Predictive Semantic World Models for Long-Horizon Mobile Robot Autonomy**

CogAI Group @ Stanford (Host: Jiajun Wu)

Apr 2026

### **Predictive Semantic Foresight for Mobile Robot Autonomy**

Kanazawa AI Research (KAIR) Lab @ UC Berkeley (Host: Angjoo Kanazawa)

Apr 2026

Co-PI Seminar on Optimization, Control, and Learning @ UCSD (Host: Nikolay Atanasov)

Apr 2026

Interactive and Trustworthy Robotics Lab @ CMU (Host: Andrea Bajcsy)

Apr 2026

### **Predictive Mapping and Semantic Reasoning for Autonomous Mobile Robots**

Scalable Spatial Intelligence Lab @ University of Michigan (Host: Yulun Tian)

Mar 2026

Robot Learning Seminar, co-organized by PIs @ University at Buffalo, Georgia Tech, Penn State (Host: Chen Wang)

Mar 2026

### **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

### **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

### **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**

Krrish Jain (CMU M.S. in Robotics)

Oct 2025 - Present

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 - Jul 2025

Aditya Parandekar (BITS Pilani - Goa)

Jun 2023 - Dec 2023

### **CMU PhD Qualifier / Master's Thesis Committee**

Andrew Jong (CMU Ph.D. in Robotics)

2026

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**

IROS 2026 Workshop on AI Meets Autonomy: Vision, Language, and Autonomous Systems

2026

IROS 2026 Workshop and Competition on Intelligent Information Gathering for Single and Multi-Robot Systems

2026

Tartan Planning Series

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, 2026  
Conference on Robot Learning (CoRL) 2026  
IEEE International Conference on Automation Science and Engineering (CASE) 2025  
IEEE International Symposium on Multi-Robot & Multi-Agent Systems (MRS) 2023  
IEEE 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> Marylee Williams, CMU School of Computer Science News	Jul 2024
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