

Juyeop Han

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RESEARCH INTEREST

Uncertainty Quantification, Generative Modeling for Robotics, Task & Motion Planning

EDUCATION

Massachusetts Institute of Technology (MIT)

Cambridge, MA

Ph.D. Candidate, Mechanical Engineering / LIDS

2023 - Present

- Advisor: Prof. Sertac Karaman

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, South Korea

M.S. in Aerospace Engineering

2021 - 2023

- Advisor: Prof. Han-Lim Choi
- Thesis: “Computation of Tight Forward Reachable Set for a Multirotor based on the Nonlinear Adaptive Controller”

Seoul National University (SNU)

Seoul, South Korea

B.S. in Mechanical Engineering

2015 - 2021

- **Summa Cum Laude**
- Leave of Absence for Mandatory Military Service (2017 - 2019)

RESEARCH EXPERIENCE

Autonomy and Embedded Robotics Accelerated Lab, MIT

Cambridge, MA

Graduate Research Assistant | PI: Prof. [Sertac Karaman](#)

2023 - Present

- Researched uncertainty quantification and compression for generative models to improve reliability and efficiency in robotics applications, including vision-language-action (VLA) models and world models [\[P1\]](#).
- Proposed a robust visual-inertial navigation system and active perception with uncertainty quantification under learning-based visual representations [\[C1\]](#), [\[C2\]](#).
- Proposed large city-scale scene reconstruction methods through neural scene representations [\[J1\]](#), [\[W1\]](#).

Autonomous Decision and Control Lab, CU Boulder

Boulder, CO

Visiting Scholar | PI: Prof. [Zachary Sunberg](#)

2022 - 2023

- Researched decision-making algorithms given task specifications under uncertainty.

Lab for information and Control Systems, KAIST

Daejeon, South Korea

Graduate Research Assistant | PI: Prof. [Han-Lim Choi](#)

2021 - 2023

- Proposed 3-dimensional dynamic occupancy grid mapping algorithm using LiDAR [\[C3\]](#).
- Proposed optimal trajectory planning algorithm and safety-guaranteed control method of a multirotor [\[C4\]](#), [\[C5\]](#).

Innovative Design and Integrated Manufacturing Lab, SNU

2020

Undergraduate Research Intern | PI: Prof. [Sung-Hoon Ahn](#)

Seoul, South Korea

- Implemented surface cleaning using a 6-DOF robot manipulator.

PUBLICATIONS

Preprints

- [P1] **Flow Matching with Uncertainty Quantification and Guidance**
Juyeop Han, Lukas Lao Beyer, and Sertac Karaman
Under Review, 2026. [\[paper\]](#) [\[code\]](#)

Journals

- [J1] **Construction of Digital Terrain Maps from Multi-view Satellite Imagery using Neural Volume Rendering**
Josef Biberstein, Juyeop Han, Guilherme V. Cavalheiro, and Sertac Karaman
IEEE Transactions on Aerospace and Electronic Systems (**T-AES**), 2026. [\[paper\]](#)

Conferences

- [C1] **SCREP: Scene Coordinate Regression and Evidential Learning-based Perception-Aware Trajectory Generation**
Juyeop Han, Lukas Lao Beyer, Guilherme V. Cavalheiro, and Sertac Karaman
IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**) (Accepted), 2026. [\[paper\]](#) [\[video\]](#)
- [C2] **NVINS: Robust Visual Inertial Navigation Fused with NeRF-augmented Camera Pose Regressor and Uncertainty Quantification (Oral)**
Juyeop Han, Lukas Lao Beyer, Guilherme V. Cavalheiro, and Sertac Karaman
IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2024. [\[paper\]](#) [\[video\]](#)
- [C3] **DS-K3DOM: 3-D Dynamic Occupancy Mapping with Kernel Inference and Dempster-Shafer Evidential Theory**
*Juyeop Han**, *Youngjae Min**, *Hyeok-Joo Chae*, *Byeongmin Jeong*, and *Han-Lim Choi*
International Conference on Robotics and Automation (**ICRA**), 2023. [\[paper\]](#) [\[code\]](#) [\[video\]](#)
- [C4] **Computing Forward Reachable Sets for Nonlinear Adaptive Multirotor Controllers**
Juyeop Han and Han-Lim Choi
American Control Conference (**ACC**), 2023. [\[paper\]](#)
- [C5] **Pseudospectral method-based safe motion planning for quadrotors in a cluttered environment**
Juyeop Han, Min-jea Tahk, and Han-Lim Choi
AIAA Science and Technology Forum (**Scitech**), 2022. [\[paper\]](#)

Workshops

- [W1] **CaLiSa-NeRF: Neural Radiance Field with Pinhole Camera Images LiDAR point clouds and Satellite Imagery for Urban Scene Representation**
Juyeop Han, Guilherme V. Cavalheiro, Josef Biberstein, Elham Alkabawi, Shahad Alqhatni, Fadwa Alaskar, Eman Bin Khunayn, and Sertac Karaman
WACV Workshop on Computer Vision for Geospatial Image Analysis (GeoCV), 2025. [\[paper\]](#)

HONORS & AWARDS

Fellowships & Scholarships

MathWorks Mechanical Engineering Fellowship , MathWorks	2024 - 2025
Korean Government Scholarship , South Korean Government	2023 - 2025
Government-Funded Scholarship , KAIST	2021 - 2023
SNU Alumni-Funded Scholarship , SNU Alumni Foundation	2020
Merit-Based Scholarship , SNU	2015 - 2017

Awards

Outstanding Award , SNU ME Materials and Manufacturing Process Course	2019
Excellence Award at I-Seoul-U Hackathon , Administration of Seoul	2016
Creative Award , SNU ME Creative Engineering Design Course	2015

TEACHING EXPERIENCE

Teaching Assistant , 16.S690/6.S080 Introduction to Autonomy	2026
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PROFESSIONAL ACTIVITIES

Organizer IROS [Rethinking Uncertainty](#) Workshop (2026), RSS [IDMAV](#) Workshop (2023)

Reviewer T-RO (2026), NeurIPS (2026), ICML (2026), RA-L (2025), L-CSS (2022)

TECHNICAL SKILLS

Programming Python, C/C++, CUDA, MATLAB

Libraries & Tools Pytorch, OpenCV, Git, Nix, LaTeX, ROS, SolidWorks

Languages Korean (Native), English (Fluent)

LEADERSHIP EXPERIENCE

Committee Member, K-RAINES (Korean robotics community in New England)

2025 - Present

Unit Supply Specialist (ROK Army Sergeant), 2nd Infantry Division, US Army

2017 - 2019