

Minsung Yoon

PH.D. CANDIDATE · SCHOOL OF COMPUTING (SoC) AT KAIST

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“Passionate about bridging AI and robotics to enhance quality of life.”

Research Keywords: motion & path planning, deep reinforcement learning, navigation under uncertainty, energy-efficient multi-modal locomotion, and safe remote manipulation

Education

KAIST (Korea Advanced Institute of Science and Technology)

PH.D. IN COMPUTER SCIENCE (ADVISOR: PROF. SUNG-EUI YOON)

• Total GPA: 4.1 / 4.3

Daejeon, South Korea

Mar. 2022 – Present

KAIST (Korea Advanced Institute of Science and Technology)

M.S. IN COMPUTER SCIENCE (ADVISOR: PROF. SUNG-EUI YOON)

• Total GPA: 4.0 / 4.3

Daejeon, South Korea

Mar. 2020 – Feb. 2022

Inha University

B.S. IN INFORMATION AND COMMUNICATION ENGINEERING (ICE)

• Graduated **Summa Cum Laude**, with a Major GPA: 4.48 / 4.5, Total GPA: 4.34 / 4.5

Incheon, South Korea

Mar. 2015 – Feb. 2019

Experience

RLWRLD

REINFORCEMENT LEARNING RESEARCH INTERN

- Contributed to **RLDX-1**, RLWRLD's first Robotics Foundational Model (RFM) for dexterous manipulation.
 - Supported evaluation of inference optimization techniques on the 48-DoF ALLEX robot platform, including custom kernel optimization, static graph compilation, and real-time action chunking.

Seoul, S.Korea

Mar. 2026 - Present

Awards & Honors

2025	Next-Generation Engineering Researcher , Institute for Promotion of Engineering and Science of Korea (IPESK) <i>Selected as an outstanding graduate researcher recognized for excellence in engineering research.</i>	S.Korea
2023	Outstanding Planning Paper Award , IEEE International Conference on Robotics and Automation (ICRA) <i>Title: “Learning-based Initialization of Trajectory Optimization for Path-following Problems of Redundant Manipulators”</i>	UK
2022	Outstanding Navigation Paper Finalist Award , IEEE International Conference on Robotics and Automation (ICRA) <i>Title: “Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning”</i>	USA
2018	Capstone Design Award (1st Place, Graduation Project) , ICE, Inha University <i>Title: “Platooning with Autonomous Driving”</i>	S.Korea
2017	National Science & Technology Scholarship , Ministry of Science and ICT (MSIT)	S.Korea
2016	Dean's List , College of IT Engineering, Inha University (Spring & Fall Semesters)	S.Korea
201[5–8]	Honor Student , Department of Information and Communication Engineering (ICE), Inha University <i>Recognized for academic excellence in 2015 Spring & Fall, 2016 Spring, 2017 Spring & Fall, 2018 Spring</i>	S.Korea

Publications

International Papers

[1] RLDX-1: A Dexterity-First Foundation Model for Robot Hands

RLWRLD TEAM (INCL. MINSUNG YOON)
Technical Report, 2026 (arXiv:2605.03269)

[2] DyGeoVLN: Infusing Dynamic Geometry Foundation Model into Vision-Language Navigation

XIANGCHEN LIU, HANGHAN ZHENG, JEIL JEONG, MINSUNG YOON, LIN ZHAO, ZHIDE ZHONG, HAOANG LI, SUNG-EUI YOON
arXiv preprint, 2026 (arXiv:2603.21269)

[3] HiPAN: Hierarchical Posture-Adaptive Navigation for Quadruped Robots in Unstructured 3D Environments

JEIL JEONG*, MINSUNG YOON*, SEOKRYUN CHOI, HEECHAN SHIN, TAEGEUN YANG, SUNG-EUI YOON
IEEE Robotics and Automation Letters (RA-L), 2026

[4] Phase-Aware Policy Learning for Skateboard Riding of Quadruped Robots via Feature-wise Linear Modulation

MINSUNG YOON*, JEIL JEONG*, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[5] Uncertainty-Aware Non-Prehensile Manipulation with Mobile Manipulators under Object-Induced Occlusion

JIWOO HWANG, TAEGEUN YANG, JEIL JEONG, MINSUNG YOON, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[6] Beyond the Patch: Exploring Vulnerabilities of Visuomotor Policies via Viewpoint-Consistent 3D Adversarial Object

CHANMI LEE, MINSUNG YOON, WOO JAE KIM, SEBIN LEE, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2026

[7] LangPert: Detecting and Handling Task-level Perturbations for Robust Object Rearrangement

XU YIN, MINSUNG YOON, YUCHI HUO, KANG ZHANG, SUNG-EUI YOON
arXiv preprint, 2025 (arXiv:2504.09893)

[8] Robust Pedipulation on Quadruped Robots via Gravitational-moment Minimization

HEECHAN SHIN, MINSUNG YOON, JEIL JEONG, SUNG-EUI YOON
International Journal of Control, Automation and Systems (IJCAS), 2025
International Conference on Control, Automation and Systems (ICCAS), 2025

[9] Efficient Navigation Among Movable Obstacles using a Mobile Manipulator via Hierarchical Policy Learning

TAEGEUN YANG, JIWOO HWANG, JEIL JEONG, MINSUNG YOON, SUNG-EUI YOON
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025

[10] Metaheuristic Asphalt Crack Sealing Path Planning based on Discrete Grey Wolf Optimizer

JEREMY C.H. ONG, MINSUNG YOON, HEECHAN SHIN, SUNG-EUI YOON, MOHD-ZULHILMI ISMADI, XIN WANG
International Journal of Hydromechatronics (IJHM), 2025

[11] Enhancing Navigation Efficiency of Quadruped Robots via Leveraging Personal Transportation Platforms

MINSUNG YOON, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2025

[12] Learning-based Adaptive Control of Quadruped Robots for Active Stabilization on Moving Platforms

MINSUNG YOON, HEECHAN SHIN, JEIL JEONG, SUNG-EUI YOON
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024
Agile Robotics Workshop @ ICRA, 2024

[13] Navigation Among Movable Obstacles with Mobile Manipulator using Learned Robot-Obstacle Interaction Model

TAEGEUN YANG, MINSUNG YOON, JEIL JEONG, SUNG-EUI YOON
Mobile Manipulation and Embodied Intelligence (MOMA.v2) Workshop @ ICRA, 2024

[14] Analysis of Terrain-Aware Optimal Path Planning Methods for Stable Off-Road Navigation

MINSUNG YOON, TAEGEUN YANG, CHANMI LEE, HYUNSIK SON, SUNG-EUI YOON
Off-Road Autonomy Workshop @ IEEE Intelligent Vehicles Symposium (IV), 2024

[15] Learning-based Initialization of Trajectory Optimization for Path-following Problems of Redundant Manipulators

MINSUNG YOON, MINCHEUL KANG, DAEHYUNG PARK, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2023 – *Outstanding Planning Paper Award, Top 1.1% (15 of 1,345 papers)*

[16] Towards Safe Remote Manipulation: User Command Adjustment based on Risk Prediction for Dynamic Obstacles

MINCHEUL KANG, MINSUNG YOON, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2023

[17] Confidence-Based Robot Navigation Under Sensor Occlusion with Deep Reinforcement Learning

HYEONGYEOL RYU, MINSUNG YOON, DAEHYUNG PARK, SUNG-EUI YOON
IEEE International Conference on Robotics and Automation (ICRA), 2022 – *Outstanding Navigation Paper Finalist Award, Top 2.7% (39 of 1,428)*
Selected as one of the KAIST 2023 Research Highlights

[18] Fast and Robust Trajectory Generation for Cartesian Path-following Problems of Redundant Manipulators

MINSUNG YOON, MINCHEUL KANG, DAEHYUNG PARK, SUNG-EUI YOON
Machine Learning for Human-Robot Interaction (HRI) Workshop @ IEEE RO-MAN, 2022

[19] Deep Neural Network-based Fast Motion Planning Framework for Quadrupedal Robot

JINHYEOK JANG, HEECHAN SHIN, MINSUNG YOON, SEUNGWOO HONG, HAE-WON PARK, SUNG-EUI YOON
Machine Learning for Motion Planning (MLMP) Workshop @ ICRA, 2021

Domestic (Korean) Papers

[20] Adversarial Attack on Visuomotor Policy

CHANMI LEE, **MINSUNG YOON**, SUNG-EUI YOON
Korea Computer Congress (KCC), 2024

[21] Manipulator-Assisted Navigation Among Movable Obstacles using Learned Robot-Obstacle Kinodynamics Model

TAEGEUN YANG, **MINSUNG YOON**, SUNG-EUI YOON
Korea Robotics Society Annual Conference (KRoC), 2024

[22] Robust Robot Navigation against External Disturbance using Deep Reinforcement Learning

HYEONGYEOL RYU, **MINSUNG YOON**, DAEHYUNG PARK, SUNG-EUI YOON
Korea Robotics Society Annual Conference (KRoC), 2021

[23] Bias Tree Expansion using Reinforcement Learning for Efficient Motion Planning

MINSUNG YOON, DAEHYUNG PARK, SUNG-EUI YOON
Korea Robotics Society Annual Conference (KRoC), 2021

Patents

[1] User Command Adjustment Based on Risk Prediction of Dynamic Obstacles for Safe Remote Manipulation

KR 10-2023-0169134, PATENT APPLICATION FILED ON NOV. 29, 2023

[2] Learning-based Initialization of Trajectory Optimization for Redundant Manipulators' Path-Following Problem

KR 10-2023-0192803, PATENT APPLICATION FILED ON DEC. 27, 2023

[3] Learning-based Adaptive Control of Quadruped Robots for Active Stabilization on Moving Platforms

KR 10-2025-0040575, PATENT APPLICATION FILED ON MAR. 28, 2025

[4] Efficient Navigation Among Movable Obstacles using a Mobile Manipulator via Hierarchical Policy Learning

KR 10-2025-0201446, PATENT APPLICATION FILED ON JAN. 8, 2026

Talks & Presentations

Tutorial Talks

Presented tutorial talks at Korea Robotics Society Annual Conference (KRoC)

Feb. 2026

- TITLE: THE EVOLUTION OF MOTION GENERATION TECHNOLOGIES FOR INTELLIGENT ROBOTS

Presented tutorial talks at Korea Robotics Society Annual Conference (KRoC)

Feb. 2025

- TITLE: ADVANCEMENTS IN MOTION GENERATION: FROM SAMPLING-BASED METHODS TO REINFORCEMENT LEARNING

Presented tutorial talks at Korea Computer Congress (KCC)

Jun. 2024

- TITLE: INTRODUCTION TO REINFORCEMENT LEARNING AND ITS APPLICATIONS IN ROBOTIC MANIPULATION

Invited Talks

Presented a guest lecture in [CS586: Robot Motion Planning and Applications]

Apr. 2025

- TITLE: INTRODUCTION OF REINFORCEMENT LEARNING WITH RELATED APPLICATIONS

Presented a guest lecture in [CS686: Robot Motion Planning and Applications]

Oct. 2023

- TITLE: REINFORCEMENT LEARNING TECHNIQUES FROM DQN TO TRPO AND PPO

Presented an invited talk at the Flagship Conference / Journal Session of KRoC 2023

Feb. 2023

- TITLE: CONFIDENCE-BASED ROBOT NAVIGATION UNDER SENSOR OCCLUSION WITH DEEP REINFORCEMENT LEARNING

Research Projects

Sonar-based Autonomous Navigation for Transparent Object Handling

Mar. 2025 – Present

SUPPORTED BY DSO NATIONAL LABORATORIES, SINGAPORE

Responsible for developing locomotion and simple collision avoidance techniques for quadruped robots using reinforcement learning.

Off-Road Autonomous Navigation

Jun. 2023 – Present

SUPPORTED BY HANWHA AEROSPACE

Responsible for optimal path planning in unstructured outdoor environments and low-level control of track-type robots.

Optimal Motion and Path Planning for Industrial Robot Arms

Mar. 2020 – Feb. 2021

SUPPORTED BY HYUNDAI HEAVY INDUSTRIES

Responsible for developing optimal path planning algorithms for industrial robotic arms in object-transporting tasks.

Development of a Quadruped Robot System

Oct. 2019 – Sep. 2024

SUPPORTED BY AGENCY FOR DEFENSE DEVELOPMENT (ADD)

Responsible for developing quadruped robot locomotion technologies (optimization-based and reinforcement learning-based).

Teaching Experience

Teaching Assistance (TA)

Robot Motion Planning and Applications (CS586), KAIST School of Computing

Spring 2025

◦ LECTURER: PROF. SUNG-EUI YOON

Robot Motion Planning and Applications (CS686), KAIST School of Computing

Fall 2023

◦ LECTURER: PROF. SUNG-EUI YOON

Introduction to Artificial Intelligence (CS470), KAIST School of Computing

Spring 2023

◦ LECTURER: PROF. DAEHYUNG PARK

Introduction to Artificial Intelligence (CS470), KAIST School of Computing

Fall 2022

◦ LECTURER: PROF. DAEHYUNG PARK

Media Coverage

Featured in KAIST Alumni News

May 2024

RECOGNIZED FOR RESEARCH PRESENTED AT ICRA 2023, RECIPIENT OF THE OUTSTANDING PLANNING PAPER AWARD

Featured in KAIST 2023 Research Highlights

Jul. 2023

RECOGNIZED FOR RESEARCH PRESENTED AT ICRA 2022, FINALIST FOR THE OUTSTANDING NAVIGATION PAPER AWARD

Featured in KAIST Research News

Jun. 2023

RECOGNIZED FOR RESEARCH PRESENTED AT ICRA 2023, RECIPIENT OF THE OUTSTANDING PLANNING PAPER AWARD

Featured in KAIST CS Department News

Jun. 2023

RECOGNIZED FOR RESEARCH PRESENTED AT ICRA 2023, RECIPIENT OF THE OUTSTANDING PLANNING PAPER AWARD

Featured in KAIST CS Department Research Highlights

Jun. 2022

RECOGNIZED FOR RESEARCH PRESENTED AT ICRA 2022, FINALIST FOR THE OUTSTANDING NAVIGATION PAPER AWARD

Skills

Programming	C, C++, Python, MATLAB
Libraries & Frameworks	PyTorch, TensorFlow, Keras, OMPL, MoveIt
Simulation Platforms	Gazebo, Mujoco, Raisim, IsaacGym/Sim/Lab, Habitat
Experienced Robot Platforms	Fetch, Go1, Jackal, Bunker Pro
Middleware	ROS 1, ROS 2
Languages	Korean (Native), English