SCOTT (SEONGWON) LEE

205 N. Goodwin Ave., Champaign, IL 61820, USA
◇ +1 217-377-9970 ◇ sl148@illinois.edu
◇ **LinkedIn** ◇ **Google Scholar** ◇ **Personal Webpage**

SUMMARY STATEMENT

- Robotics researcher specializing in **multi-robot algorithms** to solve real-world challenges in warehouse and factory automation.
- Focused on enhancing algorithmic efficiency and enabling rapid adaptation to constraint-heavy environments.
- Strong experience in integrating hardware and software for practical, impactful multi-robot system deployments.

EDUCATION

University of Illinois at Urbana-Champaign *Aug. 2021 -* ***Dec. 2026 (Expected)***
Ph.D. Candidate in Department of Mechanical Science and Engineering
Advisor: Prof. Nancy M. Amato
- Current GPA: 3.8/4.0

Yonsei University, Seoul, South Korea *Mar. 2016 - Feb. 2021*
B.S. in Department of Mechanical Engineering
Advisor: Prof. Jongeun Choi
- Granted National Science and Technology Scholarship (Full tuition)
- Overall GPA: 3.92/4.0 (Graduated with Cum Laude)

University of California, Berkeley *Jan. 2020 - May. 2020*
Exchange Student Program
- Overall GPA: 4.0/4.0

RESEARCH EXPERIENCE

Parasol Lab (Lab Webpage)
Ph.D. Candidate (Prof. Nancy M. Amato) *Aug. 2021 - present*
- **Multi-robot Task and Motion Planning (MR-TAMP) Algorithm** *June. 2022 - present*
  - Designed an MR-TMP algorithm using hypergraph-based representation and query methods.
  - Developed a hierarchical feedback mechanism for fast and efficient constraint management.
  - Integrating on warehouse-like biology lab automation system, funded by National Science Foundation (**MiV Project**).
- **Parasol Planning Library (PPL)** *June. 2022 - present*
  - Contributing to open-source C++ task and motion planning library PPL.

Machine Learning and Control System Lab (Lab Webpage)
Undergraduate Internship (Advisor: Prof. Jongeun Choi) *Aug. 2017 - Feb. 2021*
- **Deep reinforcement learning-based controller design for ground vehicles** *May. 2018 - Dec. 2018*
  - Studied A multi-task autonomous driving algorithm that minimizes driver's injuries in unexpected collisions.
  - Integrated Deep Deterministic Policy Gradient integrated with Convolutional Neural Network to efficiently analyze spatio-temporal information.
- **Controller design for Unmanned Aerial Vehicles (UAVs)** *Jan. 2019 - May. 2020*
  - Developed a robust controller for UAVs under external and internal uncertainties using Dynamic Inversion combined with Recursive Least Square.
  - Designed an Extended High-Gain Observer for state and uncertainty estimator.
  - Integrated the controller into a quadrotor and a small-scale helicopter.

Deep Machine Lab (Startup) (**Webpage**) Feb. 2021 - Jun. 2021
Machine Learning Researcher (Supervisor: Prof. Hanseok Ko)
- **Multimodal Human-interactive Avatar**
  - Developed a virtual avatar that interacts with humans by utilizing multimodal gesture generation networks.
  - Constructed a real-time data storing infrastructure using Google Cloud Platform with pixel streaming techniques.

PUBLICATIONS

- **Seongwon Lee**, James Motes, Isaac Ngui, Marco Morales, Nancy M. Amato, "Lazy DaSH: Lazy Approach for Hypergraph based Multi-robot Task and Motion Planning" ***Preparing for Submission***
- **Seongwon Lee**, James Motes, Isaac Ngui, Marco Morales, Nancy M. Amato, "Lazy DaSH: Lazy Approach for Hypergraph based Multi-robot Task and Motion Planning" ***ICRA@40 Extended Abstract***
- Isaac Ngui, **Seongwon Lee**, James Motes, Marco Morales, Nancy M. Amato, "A hierarchical Approach to Workstation-based Task Allocation and Motion Planning" ***IROS 2023 Workshop Paper***

- **Seongwon Lee**, Joohwan Seo, Connor J. Boss, Joonho Lee, Jongeun Choi, "Output Feedback Control Design for Quadrotors Using Recursive Least Square Dynamic Inversion" ***Elsevier Mechatronics***
- Myunhoe Kim, **Seongwon Lee**, Jaehyun Lim, Jongeun Choi, Seong Gu Kang, "Unexpected Collision Avoidance Driving Strategy Using Deep Reinforcement Learning" ***IEEE Access***
- Joohwan Seo, **Seongwon Lee**, Joonho Lee, and Jongeun Choi, "Nonaffine helicopter control design and implementation based on a robust explicit nonlinear model predictive control" ***IEEE Transactions on Control System Technology***

PROJECT EXPERIENCE

Mind in Vitro (MiV) Project (**Project Description**) *Jan. 2023 - present*

- Developing an MR-TMP algorithm for automating warehouse-like biology lab operations.

ICRA2019, DJI Robomaster AI Challenge (**Project Description** *Feb. 2021 - Jun. 2021*

- Achieved 3^{rd} place among 32 selected teams worldwide.
- Implemented a Multi-Agent DDPG (MADDPG) algorithm for collaborative maneuver.

AWARDS AND SCHOLARSHIPS

National Science and Technology Scholarship, Korea Student Aid Foundation *2016-2020*
Highest Honor, Yonsei University *Fall 2016*
High Honor, Yonsei University *Spring 2016, Spring 2017*
Honor, Yonsei University *Fall 2018*

TEACHING & MENTORING EXPERIENCES

Research Program Mentor Computer Science at UIUC *Fall 2023, Summer 2024, Spring 2024*
ME 310 Fluid Mechanics *Fall 2022, Spring 2024, Fall 2024*
TAM 541 Mathematical Methods *Fall 2023*

TECHNICAL SKILLS

Programming Tools	C++, C, Python, Javascript, Docker
Robotics Tools	Robot Operating System (ROS), Gazebo, Mujoco, Unreal Engine, Simulink
Hardware	Universal Robot Manipulators, Intel Realsense, Nvidia Jetson, Raspberry Pi, Arduino
Modeling	Autodesk 360, Creo
Graphics	Premiere Pro, Photoshop, Illustrator

LEADERSHIP EXPERIENCE

- **Military Service for Republic of Korea**
  Platoon leader's secretary *Mar. 2014 - Dec. 2015*
  - Completed military service as a sergeant.
- **Korean Society Association in UIUC**
  Graduate Student President *Aug. 2023 - July. 2024*
  - Organized the social and job fair events for Korean graduate students at UIUC as a graduate student president.
- **Student Council of School of Mechanical Engineering in Yonsei University**
  Student President *Mar. 2016 - Dec. 2016*
  - Served as a student president of the School of Mechanical Engineering at Yonsei University.
- **Korean Soccer Club in UIUC**
  Captain *May. 2024 - present*
- **Soccer Club of the School Of Mechanical Engineering at Yonsei University**
  Captain *Dec. 2017 - May. 2018*