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 improving algorithmic efficiency through hierarchical structure and effective constraint management.
✓ Experience in hardware and software integration for practical and 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

EXPERIENCES

X, The Moonshot Factory (formerly Google X) (Webpage)
Ph.D. Resident
- **Stealth Project:** Automation, Large Language Model, Multi-agent system *May. 2025 - present*

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

Machine Learning and Control System Lab (Lab Webpage)
Undergraduate Internship (Advisor: Prof. Jongeun Choi)
- **Deep Reinforcement Learning-based Controller Design for Ground Vehicles** *May. 2018 - Dec. 2018*
  - Developed a multi-task autonomous driving algorithm to minimize driver injuries in collisions.
  - Integrated Deep Deterministic Policy Gradient with Convolutional Neural Network for efficient spatio-temporal analysis.
- **Controller Design for Unmanned Aerial Vehicles (UAVs)** *Jan. 2019 - May. 2020*
  - Developed a robust UAV controller using Dynamic Inversion and Recursive Least Square methods.
  - Designed an Extended High-Gain Observer for state and uncertainty estimation.
  - Integrated the controller into a quadrotor and small-scale helicopter.

ICRA2019, DJI Robomaster AI Challenge (**Project Description**) *Feb. 2021 - Jun. 2021*
- **Multi-robot Reinforcement Learning Algorithm**
  - Achieved 3^{rd} place among 32 selected teams worldwide.
  - Implemented a Multi-Agent DDPG (MADDPG) algorithm for collaborative maneuver.

Deep Machine Lab (Startup, acquired by Ben) (**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 using multimodal gesture generation networks.

Engineering Open House (EOH) (**Webpage**) *Apr. 2024*
- **Factory Automation Demo**
  - Presented a demo on factory automation to middle and high school students during EOH at UIUC.

Teaching & Mentoring

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

PUBLICATIONS

Ordered in chronological order ÷ Non-peer-reviewed • Peer-reviewed

- **Seongwon Lee**, James Motes, Isaac Ngui, Marco Morales, Nancy M. Amato, "Lazy DaSH: Lazy Approach for Hypergraph based Multi-robot Task and Motion Planning" **Under Review**
- ÷ **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**

TECHNICAL SKILLS

Programming Tools	C++, C, Python, Javascript, Docker
Robotics Tools	Robot Operating System (ROS2), Gazebo, Mujoco, Unreal Engine, Simulink
Hardware	Universal Robot Manipulators, Intel Realsense, Nvidia Jetson, Raspberry Pi, Arduino
Modeling	Autodesk 360, Creo

LEADERSHIP EXPERIENCE

- **Military Service for Republic of Korea** *Mar. 2014 - Dec. 2015*
- **Student Organizational Roles**
  - Leading Korean Graduate Roboticist Group at UIUC *Aug. 2024 - present*
  - Graduate student president of Korean Society Association at UIUC *Aug. 2023 - July. 2024*
  - Student president of School of Mechanical Engineering at Yonsei University *Mar. 2016 - Dec. 2016*