Gilwoo Lee

SHORT BIOGRAPHY

I am a 3rd year PhD student in Paul G. Allen School of Computer Science & Engineering at the University of Washington, recently moved from Robotics Institute at Carnegie Mellon University, as my advisor Siddhartha S. Srinivasa has moved. I have received B.S. and M.Eng at MIT, where I was co-advised by Leslie Pack Kaelbling and Tomas Lozano-Perez. I am a recipient of Kwanjeong Educational Foundation Fellowship and have previously received CMU School of Computer Science Presidential Fellowship and Samsung Scholarship.

My primary research interest is to enable robots to manipulate various objects under uncertainty and acquire diverse manipulation skills. More broadly, I am interested in domain adaptation for model-based reinforcement learning and machine learning with physics priors for motion prediction. In the past I have worked on a variety of problems in robotics and computer graphics. In robotics, I have worked on multi-contact nonprehensile manipulation, and error-detection and recovery in multi-step planning. For robot vision, I have worked on SLAM-based object pose estimation. In computer graphics, I have worked on skin deformation and lighting for 3D animation.

EDUCATION

University of Washington
Seattle, WA
Ph.D. Student in Computer Science
Jan. 2018 - June 2021 (expected)
Advisor: Siddhartha S. Srinivasa

Carnegie Mellon University
Pittsburgh, PA
M.S. student in Robotics
Sep. 2015 – May 2017
Advisor: Matthew T. Mason, Siddhartha S. Srinivasa
Thesis: *GP-ILQG: Data-driven Robust Optimal Control for Uncertain Nonlinear Dynamical Systems*

Massachusetts Institute of Technology (GPA: 5.0 / 5.0)
Cambridge, MA
M.Eng. in Electrical Engineering and Computer Science
June 2015
Advisor: Leslie P. Kaelbling, Tomás Lozano-Peréz
Thesis: *Hierarchical planning for multi-contact non-prehensile manipulation*

Massachusetts Institute of Technology (GPA: 4.7 / 5.0)
Cambridge, MA
B.S. in EECS and Mathematics
June 2010

AWARDS & HONORS

Kwanjeong Educational Foundation Fellowship	2015 – 2019
CMU School of Computer Science Presidential Fellowship	2016 – 2017
IROS Best Paper Finalist, *Hierarchical planning for multi-contact non-prehensile manipulation*	2015
Samsung Scholarship, one of ten undergraduate awardees	2006 – 2010

RESEARCH

Personal Robotics Lab
CMU RI, Univ. of Washington
Research Associate
Sep. 2015 – Present
- Developing algorithms for reinforcement learning-based robust control of robots under uncertainty
- Developed and maintained multistep planning framework for manipulation
- Developed and maintained error detection and recovery scheme for multistep planning and execution

Oculus Research Pittsburgh
Oculus
Ph.D. Intern
May 2017 – Dec. 2017
- Worked on research problems related to Virtual Reality in social settings

Learning and Intelligent Systems Group
MIT CSAIL
Research Associate
Jan. 2014 – June 2015
- Developed planning algorithm for multi-contact nonprehensile object manipulation

MIT DARPA Robotics Challenge Team MIT CSAIL

Research Associate Jan. – June 2014
- Extended Parallel Tracking and Mapping algorithm for object pose estimation and tracking in pre-grasping stage

Walt Disney Animation Studios Burbank, CA

Research Associate, *Animation Technology Research Team* Jan 2010
- Implemented and analyzed heat-based skin attachment algorithm and compared it against skeleton-subspace-deformation method

Canon Tokyo, Japan

Research Associate, *Visual Information Processing Technology Development Center* June – Dec. 2008
- Designed and implemented interactive photoframe that learns user's facial expressions to display photos evoking positive reaction
- Collaborated with Waseda University for predicting future demand for monitoring systems in senior care industry

PUBLICATION

Gilwoo Lee, Siddhartha S. Srinivasa, Matthew T. Mason **GP-ILQG: Data-driven Robust Optimal Control for Uncertain Nonlinear Dynamical Systems**, *arXiv:1705.05344 [cs.RO], 2017.*

Siddhartha S. Srinivasa, Gilwoo Lee, et. al. **A System for Multi-Step Mobile Manipulation: Architecture, Algorithms, and Experiments**, *International Symposium on Experimental Robotics (ISER), 2016.*

Gilwoo Lee, Leslie P. Kaelbling, Tomas Lozano-Perez. **Hierarchical planning for multi-contact non-prehensile manipulation**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2015.* [**Best Conference Paper Finalist**]

Jung-Moo Kim, Gilwoo Lee, Joon Young Yoon, and Sang Hun Shin. **New method for determining the coiling ratio of planktonic Foraminifera using digital image analysis**, *J. Paleont. Soc. Korea.* Vol. 20, No. 1, 2004.

PROFESSIONAL ACTIVITIES

Organizer, **RSS 2017 Workshop on (Empirically) Data-Driven Manipulation**

Panel, **IEEE IROS 2017 Tutorial on Development of Benchmarking Protocols for Robot Manipulation**

Reviewer, **IEEE/RSJ International Conference on Intelligent Robots and System (IROS)**

Reviewer, **Robotics: Science and Systems (RSS)**

Reviewer, **International Journal of Robotics Research (IJRR)**

PROGRAMMING SKILLS

Extensive experience in C++, Python, MATLAB, and Java.

TEACHING EXPERIENCE

CMU RI 16-662 Robot Autonomy CMU

Teaching Assistant Spring 2017
- Managed grades and assignments for students; assisted in lesson planning
- Mentored group projects

MIT 6.005 Software Construction MIT

Teaching Assistant Spring & Fall 2014, Spring 2015
- Managed grades and code review assignments for students and teaching staff; assisted in lesson planning
- Graded individual student assignments and mentored their group projects

VOLUNTEER ACTIVITIES

Undergraduate Student Advisory Group in EECS (USAGE) Cambridge, MA

Member 2014 – 2015
- Advised for curriculum changes and getting more entrepreneurial opportunities for EECS undergraduates

WORK EXPERIENCE

GIST   Sunnyvale, CA
Co-founder, Lead Developer   2013
- Designed algorithm that crawls news and extracts key contents through Natural Language Processing
- Led the development team for mobile application development
- Raised seed funding through Plug and Play Tech Center's incubator program

Michigan Venture Capital   Seoul, Korea
Analyst, *Investment Team*   2012
- Managed three media-focused funds, each valued at 10M - 15M USD
- Supervised opening of *Ultra Music Festival Korea*
- Supervised three film productions for casting, production schedule, distributor contracts; broke advance sales record

DreamWorks Animation SKG   Glendale, CA
Technical Director, *Kung Fu Panda 2 Production Team*   July 2010 – June 2011
- Developed and assisted in managing production pipeline
- Tested new in-house lighting algorithms and management tools
- Resolved technical issues for lighting artists and optimized rendering process on a daily basis