

Youngwoon Lee

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RESEARCH INTERESTS

My research goal is to enable complex robotic systems to **learn complex long-horizon tasks**. Particularly, I focus on developing a scalable robot learning framework that can leverage prior knowledge and data. My research interests include deep reinforcement learning, imitation learning, multi-modal representation learning, and simulation-to-real transfer for robotics.

CURRENT POSITION

University of California, Berkeley, CA Jan 2023 - Present
Postdoctoral Scholar (Advisor: Pieter Abbeel)

EDUCATION

University of Southern California, Los Angeles, CA Aug 2017 - Dec 2022
Ph.D. in Computer Science (Advisor: Joseph J. Lim)

KAIST, Daejeon, Korea Feb 2011 - Feb 2013
M.S. in Computer Science (Advisor: Sung-Eui Yoon)

KAIST, Daejeon, Korea Feb 2007 - Feb 2011
B.S. in Computer Science (Summa Cum Laude)

PROFESSIONAL EXPERIENCE

University of California, Berkeley, CA Aug 2022 - Present
Postdoctoral Scholar and *Visiting Scholar* with Pieter Abbeel
- Research in robot learning and deep reinforcement learning

NAVER CLOVA AI Research, Seongnam, Korea Feb 2021 - Aug 2021
Research Intern
- Research in robot learning and deep reinforcement learning for recommendation systems

NVIDIA Research, Santa Clara, CA May 2020 - Aug 2020
Research Intern with Yuke Zhu and Anima Anandkumar
- Research in skill chaining and imitation learning

SKT T-Brain, Seoul, Korea May 2018 - Aug 2018
Research Intern
- Research in deep reinforcement learning

University of Southern California, Los Angeles, CA Feb 2017 - Jul 2017
Visiting Scholar with Joseph J. Lim
- Building IKEA furniture assembly simulator for robot learning

Electronics and Telecommunications Research Institute, Daejeon, Korea Mar 2013 - Jan 2017
Researcher (alternative military service)
- Research in user segmentation and user-virtual object interaction using Kinect for mixed reality

CONFERENCE PAPERS

- [C14] Lucy Xiaoyang Shi, Joseph J. Lim, and **Youngwoon Lee**. “Skill-based Model-based Reinforcement Learning”, *Conference on Robot Learning (CoRL)*, 2022
- [C13] **Youngwoon Lee***, Andrew Szot*, Shao-Hua Sun, and Joseph J. Lim. “Generalizable Imitation Learning from Observation via Inferring Goal Proximity”, *Neural Information Processing Systems (NeurIPS)*, 2021
- [C12] **Youngwoon Lee**, Joseph J. Lim, Anima Anandkumar, and Yuke Zhu. “Adversarial Skill Chaining for Long-Horizon Robot Manipulation via Terminal State Regularization”, *Conference on Robot Learning (CoRL)*, 2021
- [C11] Karl Pertsch, **Youngwoon Lee**, Yue Wu, and Joseph J. Lim. “Demonstration-Guided Reinforcement Learning with Learned Skills”, *Conference on Robot Learning (CoRL)*, 2021
- [C10] I-Chun Arthur Liu*, Shagun Uppal*, Gaurav S. Sukhatme, Joseph J. Lim, Peter Englert, and **Youngwoon Lee**. “Distilling Motion-Planner Augmented Policies into Visual Control Policies for Robot Manipulation”, *Conference on Robot Learning (CoRL)*, 2021
- [C9] Grace Zhang, Linghan Zhong, **Youngwoon Lee**, and Joseph J. Lim. “Policy Transfer across Visual and Dynamics Domain Gaps via Iterative Grounding”, *Robotics: Science and Systems (RSS)*, 2021
- [C8] **Youngwoon Lee**, Edward S. Hu, and Joseph J. Lim. “IKEA Furniture Assembly Environment for Long-Horizon Complex Manipulation Tasks”, *IEEE International Conference on Robotics and Automation (ICRA)*, 2021
- [C7] Karl Pertsch, **Youngwoon Lee**, and Joseph J. Lim. “Accelerating Reinforcement Learning with Learned Skill Priors”, *Conference on Robot Learning (CoRL)*, 2020
- [C6] Jun Yamada*, **Youngwoon Lee***, Gautam Salhotra, Karl Pertsch, Max Pflueger, Gaurav S. Sukhatme, Joseph J. Lim, and Peter Englert. “Motion Planner Augmented Reinforcement Learning for Robot Manipulation in Obstructed Environments”, *Conference on Robot Learning (CoRL)*, 2020
- [C5] **Youngwoon Lee**, Jingyun Yang, and Joseph J. Lim. “Learning to Coordinate Manipulation Skills via Skill Behavior Diversification”, *International Conference on Learning Representations (ICLR)*, 2020
- [C4] **Youngwoon Lee**, Edward S. Hu, Zhengyu Yang, and Joseph J. Lim. “To Follow or not to Follow: Selective Imitation Learning from Observations”, *Conference on Robot Learning (CoRL)*, 2019
- [C3] **Youngwoon Lee***, Shao-Hua Sun*, Sriram Somasundaram, Edward S. Hu, and Joseph J. Lim. “Composing Complex Skills by Learning Transition Policies”, *International Conference on Learning Representations (ICLR)*, 2019
- [C2] **Youngwoon Lee**, Jae-Pil Heo, and Sung-Eui Yoon. “Quadra-Embedding: Binary Code Embedding with Low Quantization Error”, *Asian Conference on Computer Vision (ACCV)*, 2012
- [C1] Jae-Pil Heo, **Youngwoon Lee**, Junfeng He, Shih-Fu Chang, and Sung-Eui Yoon. “Spherical Hashing”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2012

JOURNAL PAPERS

- [J2] Jae-Pil Heo, **Youngwoon Lee**, Junfeng He, Shih-Fu Chang, and Sung-Eui Yoon. “Spherical Hashing: Binary Code Embedding with Hyperspheres”, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2015
- [J1] **Youngwoon Lee**, Jae-Pil Heo, and Sung-Eui Yoon. “Quadra-Embedding: Binary Code Embedding with Low Quantization Error”, *Computer Vision and Image Understanding (CVIU)*, 2014

TECHNICAL REPORTS

- [T3] I-Chun Arthur Liu*, Shagun Uppal*, Gaurav S. Sukhatme, Joseph J. Lim, Peter Englert, and **Youngwoon Lee**. “Distilling Motion-Planner Augmented Policies into Visual Control Policies for Robot Manipulation”, *IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop on Combining Learning and Motion Planning (IROS CLAMP Workshop)*, 2021
- [T2] Karl Pertsch, **Youngwoon Lee**, Yue Wu, and Joseph J. Lim. “Demonstration-Guided Reinforcement Learning with Learned Skills”, *International Conference on Learning Representations Workshop on Self-supervision for Reinforcement Learning (ICLR SSL-RL Workshop)*, 2021
- [T1] Jun Yamada, Gautam Salhotra, **Youngwoon Lee**, Max Pflueger, Karl Pertsch, Peter Englert, Gaurav S. Sukhatme, and Joseph J. Lim. “Motion Planner Augmented Action Spaces for Reinforcement Learning”, *Robotics: Science and Systems Workshop on Action Representations for Learning in Continuous Control (RSS Workshop)*, 2020

HONORS AND AWARDS

- RSS Pioneer, Robotics: Science and Systems Pioneers Workshop 2022
- *Selected as one of 30 top early-career researchers in robotics*
- Best Paper Presentation Award, CoRL 2020
- Best Paper Runner-up, NeurIPS Workshop on Robot Learning 2020
- USC Annenberg Fellowship 2017 - 2022
- KAIST Distinguished MS Thesis Award 2013
- KFAS Doctoral Fellowship 2011 - 2012
- Honorable Mention, ACM-ICPC 2010 World Finals, Harbin, China 2010
- 1st Place, ACM-ICPC 2009-2010 Seoul Regional, Korea 2009
- Google Prize Scholarship 2009
- 49th Place, ACM-ICPC 2009 World Finals, Stockholm, Sweden 2009
- 5th Place, ACM-ICPC 2008-2009 Seoul Regional, Korea 2008
- KAIST Merit-based Scholarship 2008 - 2010
- *Awarded to the top four undergraduates in Computer Science*
- KAIST Undergraduate Scholarship 2007 - 2010

INVITED TALKS

Scaling Robot Learning with Skills: Furniture Assembly and Beyond

- KAIST, Invited talk at SGVR lab Aug 29, 2022
- Yonsei University, Faculty job talk Aug 22, 2022
- Seoul National University, AI Summer School Aug 1, 2022
- UC Berkeley, Postdoc job talk at Pieter Abbeel’s lab Jun 22, 2022
- University of Pennsylvania, GRASP Student Faculty Industry (SFI) Seminar Series Apr 27, 2022

Hierarchical Reinforcement Learning with Attention Network

- Kakao CSP Workshop Jun 28, 2018

TEACHING

<i>Teaching Assistant</i> , USC CSCI-566 Deep Learning and its Application (Joseph J. Lim)	Fall 2019
<i>Teaching Assistant</i> , USC CSCI-599 Deep Learning and its Application (Joseph J. Lim)	Spring 2019
<i>Teaching Assistant</i> , USC CSCI-599 Deep Learning and its Application (Joseph J. Lim)	Fall 2017
<i>Teaching Assistant</i> , KAIST CS101 Introduction to Programming (Sue Moon)	Fall 2012
<i>Teaching Assistant</i> , KAIST CS330 Introduction to Operating System (Insik Shin)	Fall 2011
<i>Teaching Assistant</i> , KAIST CS206 Data Structure (Otfried Cheong)	Spring 2011
<i>Instructor</i> , KAIST Korean Musical Instrument “Jang-gu” for Freshmen	2009
<i>Teaching Assistant</i> , Korea Information Science Society International Olympiad in Informatics (IOI) Training Camp	Summer 2008 - 2012
<i>Instructor</i> , Gyeonggi Province Office of Education Korea Olympiad in Informatics (KOI) Training Lectures	Spring 2008 - 2011

STUDENT MENTORING

Ph.D. Students

- Grace Zhang (USC) RSS 2021

Master’s Students

- Minh Heo (KAIST) Robotic Manipulation Benchmark (in-progress)
- Doohyun Lee (KAIST) Robotic Manipulation Benchmark (in-progress)
- Zetai Yu (USC) IKEA Furniture Assembly Environment
- Shivin Dass (USC) Assisted Teleoperation (in-progress)
- I-Chun Arthur Liu (USC) CoRL 2021

Undergraduate Students

- Amber Xie (UC Berkeley) Learning for Planning (in-progress)
- Lucy X. Shi (USC) CoRL 2022
- Linghan Zhong (USC) RSS 2021
- Alex Yin (USC → Software engineer at XCOM Labs) ICRA 2021
- Jingyun Yang (USC → Master’s student at CMU → Ph.D. student at Stanford) ICLR 2020
- Zhengyu Yang (USC → Research engineer at Meta) CoRL 2019, ICRA 2021
- Andrew Szot (USC → Ph.D. student at Georgia Tech) NeurIPS 2021
- Edward S. Hu (USC → Ph.D. student at UPenn) ICLR 2019, CoRL 2019, ICRA 2021

- Sriram Somasundaram (USC → Master’s student at Stanford) ICLR 2019

Visiting Scholars

- Shagun Uppal (USC → Master’s student at CMU) CoRL 2021
- Jun Yamada (USC → Ph.D. student at Oxford) CoRL 2020

SERVICES

Workshop Organizer

- *Local Chair*, RSS Pioneers Workshop, RSS 2023 (expected)
- *Co-organizer*, Workshop on Combining Learning and Motion Planning, IROS 2021

Reviewer

- NeurIPS, ICLR, ICML, CoRL, RSS, T-RO, RA-L, ICRA, IROS

Problem Setter

- Korea Olympiad in Informatics (KOI), ACM-ICPC Korea Regional

SELECTED PRESS COVERAGE

- [P1] “An IKEA furniture assembly environment to train robots on complex manipulation tasks,” by Ingrid Fadelli, *Tech Xplore*, Dec 13, 2019.
- [P2] “Robots are learning to assemble IKEA furniture, and suddenly we love robots,” by Benjamin Bullard, *SYFY*, Nov 24, 2019.
- [P3] “Why Robots Should Learn to Build Crappy Ikea Furniture,” by Matt Simon, *WIRED*, Nov 22, 2019.
- [P4] “You wanted flying cars and colony worlds. Instead, IKEA furniture-building-ish AI robots,” by Katyanna Quach, *The Register*, Nov 21, 2019.

Last Update : October 29, 2022