

# Beomjoon Kim

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<b>Education</b>	<p><i>Ph.D. in Computer Science</i> Sept 2014 - May 2020 (Advisors: Leslie Pack Kaelbling and Tomás Lozano-Pérez) <b>Massachusetts Institute of Technology, EECS</b>, Cambridge, USA</p> <p><i>M.Sc. in Computer Science</i> Jan 2012 - Dec 2013 (Advisor: Joelle Pineau) <b>McGill University, School of Computer Science</b>, Montreal, Canada</p> <p><i>BMath. in Joint Honours of Computer Science and Statistics (with Distinction)</i> Sep 2007 - Dec 2011 <b>University of Waterloo, Faculty of Mathematics</b>, Waterloo, Canada</p>	
<b>Journal Papers</b>	<p><b>Representation, learning, and planning algorithms for geometric task and motion planning</b> <u>Beomjoon Kim</u>, Luke Shimanuki, Leslie P. Kaelbling, Tomás Lozano-Pérez. <i>International Journal of Robotics Research (IJRR)</i>, 2021.</p> <p><b>Integrated task and motion planning</b> Caelan Reed Garrett, Rohan Chitnis, Rachel Holladay, <u>Beomjoon Kim</u>, Tom Silver, Leslie P. Kaelbling, Tomás Lozano-Pérez. <i>Annual Review of Control, Robotics, and Autonomous Systems</i>, 2021.</p> <p><b>Learning to guide task and motion planning using score-space representation</b> <u>Beomjoon Kim</u>, Zi Wang, Leslie P. Kaelbling, Tomás Lozano-Pérez. <i>International Journal of Robotics Research (IJRR)</i>, 2019.</p> <p><b>Socially adaptive path planning in dynamic environments using inverse reinforcement learning</b> <u>Beomjoon Kim</u>, Joelle Pineau. <i>International Journal of Social Robotics</i>, 2015.</p>	
<b>Conference Papers</b>	<p><b>Preference learning for guiding the tree search in continuous POMDPs</b> Jiyong Ahn, Sanghyeon Son, Dongryung Lee, Jisu Han, Dongwon Son., <u>Beomjoon Kim</u>. <i>Conference on Robot Learning (CoRL)</i>, 2023.</p> <p><b>Pre- and post-contact policy decomposition for non-prehensile manipulation with zero-shot sim-to-real transfer.</b> Minchan Kim, Junhyek Han, Jaehyung Kim, <u>Beomjoon Kim</u>. <i>International Conference on Intelligent Robots and Systems (IROS)</i>, 2023.</p> <p><b>Local object crop collision network for efficient simulation of non-convex objects in GPU-based simulators.</b> Dongwon Son, <u>Beomjoon Kim</u>. <i>Robotics: Science and Systems (RSS)</i>, 2023.</p> <p><b>Ohm<sup>2</sup>: Optimal hierarchical planner for object search in large environments</b></p>	

**via mobile manipulation**

Yoonyoung Cho\*, Donghoon Shin\*, Beomjoon Kim.

*International Conference on Intelligent Robots and Systems (IROS)*, 2022.

**A long horizon planning framework for manipulating rigid pointcloud objects**

Anthony Simeonov, Yilun Du, Beomjoon Kim, Francoi Hogan, Joshua Tenenbaum, Pulkit Agrawal, Alberto Rodriguez.

*Conference on Robot Learning (CoRL)*, 2020.

**CAMPs: learning context-specific abstractions for efficient planning in factored MDPs**

Rohan Chitnis\*, Tom Silver\*, Beomjoon Kim, Leslie Pack Kaelbling, Tomás Lozano-Pérez.

*Conference on Robot Learning (CoRL)*, 2020.

(Plenary talk 12% acceptance rate)

**Monte Carlo Tree Search in continuous spaces using Voronoi optimistic optimization with regret bounds**

Beomjoon Kim, Kyungjae Lee, Sungbin Lim, Leslie P. Kaelbling, Tomás Lozano-Pérez. *AAAI Conference on Artificial Intelligence (AAAI)*, 2020.

(20.6% acceptance rate. Selected for an oral presentation)

**Learning value functions with relational state representations for guiding task-and-motion planning**

Beomjoon Kim, Luke Shimanuki.

*Conference on Robot Learning (CoRL)*, 2019.

(27.6% acceptance rate)

**Adversarial actor-critic method for task and motion planning problems using planning experience**

Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.

*AAAI Conference on Artificial Intelligence (AAAI)*, 2019.

(16.2% acceptance rate. Selected for an oral presentation with 6% acceptance rate)

**Regret bounds for meta Bayesian optimization with an unknown Gaussian process prior**

Beomjoon Kim\*, Zi Wang\*, Leslie P. Kaelbling. (\* indicates equal contribution)

*Neural Information Processing Systems (NeurIPS)*, 2018.

(20.8% acceptance rate. Selected for a spotlight presentation with 3.5% acceptance rate)

**Guiding search in continuous state-action spaces by learning an action sampler from off-target search experience**

Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.

*AAAI Conference on Artificial Intelligence (AAAI)*, 2018.

(24.6% acceptance rate. Selected for an oral presentation)

**Learning to guide task and motion planning using score-space representation**

Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.

*IEEE International Conference on Robotics and Automation (ICRA)*, 2017.

(Winner of Best Cognitive Robotics Paper Award)

**Generalizing over uncertain dynamics for online trajectory generation**

Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.  
*International Symposium on Robotics Research (ISRR)*, 2015.

**Learning from limited demonstrations**

Beomjoon Kim, Amir M. Farahmand, Joelle Pineau, Doina Precup.  
*Neural Information Processing Systems (NeurIPS)*, 2013.  
(25.3% acceptance rate. Selected for a spotlight presentation with 4% acceptance rate)

**Maximum mean discrepancy imitation learning**

Beomjoon Kim, Joelle Pineau.  
*Robotics: Science and Systems (RSS)*, 2013.  
(30% acceptance rate)

**Research  
Experience**

*Research Assistant*, Reasoning and Learning Lab, McGill University.  
Montreal, QC. Jan 2012 - Dec 2013

Developed novel reinforcement and imitation learning methods and applied them to the path planning for a robotic wheelchair. Advised by Joelle Pineau.

*Research Assistant*, Reasoning and Learning Lab, McGill University.  
Montreal, QC. Jan 2011 - April 2011

Applied a POMDP solver to the user intention inference problem for a robotic wheelchair. Advised by Joelle Pineau.

*Research Assistant*, Department of National Defence - Center for operational R&D.  
Ottawa, ON. Sept 2008 - Dec 2008

Developed a novel genetic algorithm for an aircraft cargo-loading problem. Advised by Bohdan L. Kaluzny.

**Teaching  
Experience**

*Teaching Assistant for 6.036 Intro to Machine Learning*, MIT.  
Boston, MA. Sept 2017 - Dec 2017

Helped design exams, weekly labs, and problem sets. Held office hours and answered questions on the course on-line forum to help students with course materials.

**Industry  
Experience**

*Machine Learning Engineer*, Thalmic Labs.  
Waterloo, ON. Jan 2014 - April 2014

Developed a gesture recognition algorithm for a gesture-controlled human-computer interaction device.

*Digital Signal Processing Algorithm Developer*, ON Semiconductor.  
Waterloo, ON. Jan 2010 - April 2010

Developed noise reduction and echo cancellation algorithms for cell phone chips.

*Software Consultant*, Engenuity Corporation.  
Toronto, ON. May 2009 - Aug 2009

Developed diverse software for different customer enterprises. Web development using JQuery and embedded system development for medical equipment.

**Awards**

*ICRA Best Cognitive Robotics Paper Award, 2017*

*McGill GREAT Award, 2013*

*NSERC Undergraduate Student Research Award, 2010*

*University of Waterloo Full-time Bursary (merit-based), 2007-2011*

*University of Waterloo President's Scholarship, 2007*