

# ZACHARY K. KINGSTON

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Houston, TX 77030

## EDUCATION

RICE UNIVERSITY <i>Houston, TX</i>	Ph.D. in Computer Science Advisor: Dr. Lydia Kavraki	Aug. 2016 – Present
RICE UNIVERSITY <i>Houston, TX</i>	M.S. in Computer Science Thesis: <i>A Unifying Framework for Constrained Sampling-Based Planning</i> Advisor: Dr. Lydia Kavraki	Aug. 2016 – Dec. 2017
RICE UNIVERSITY <i>Houston, TX</i>	B.S. in Computer Science	Aug. 2012 – May 2016

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## EXPERIENCE

KAVRAKI ROBOTICS LAB <i>at Rice University, Houston, TX</i>	Graduate Student Advisor: Dr. Lydia Kavraki	Aug. 2016 – Present <a href="http://kavrakilab.org/">http://kavrakilab.org/</a>
DEXTEROUS ROBOTICS LAB <i>at NASA JSC, Houston, TX</i>	NSTRF Fellow Supervisor: Dr. Julia Badger	Aug. 2017 – Present <a href="https://er.jsc.nasa.gov/er4/">https://er.jsc.nasa.gov/er4/</a>
DEXTEROUS ROBOTICS LAB <i>at NASA JSC, Houston, TX</i>	USRA Intern Supervisor: Dr. Julia Badger	May. 2017 – Aug. 2017 <a href="https://er.jsc.nasa.gov/er4/">https://er.jsc.nasa.gov/er4/</a>
DEXTEROUS ROBOTICS LAB <i>at NASA JSC, Houston, TX</i>	Guest Researcher Supervisor: Dr. Julia Badger	Jul. 2016 – Aug. 2016 <a href="https://er.jsc.nasa.gov/er4/">https://er.jsc.nasa.gov/er4/</a>
KAVRAKI ROBOTICS LAB <i>at Rice University, Houston, TX</i>	Undergraduate Researcher Advisor: Dr. Lydia Kavraki	Feb. 2015 – Aug. 2016 <a href="http://kavrakilab.org/">http://kavrakilab.org/</a>
MULTI-ROBOT SYSTEMS LAB <i>at Rice University, Houston, TX</i>	Undergraduate Researcher Advisor: Dr. James McLurkin	May 2014 – May 2015 <a href="http://mrsl.rice.edu/">http://mrsl.rice.edu/</a>

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## PUBLICATIONS

All publications are available at <http://zkingston.com>

### PEER-REVIEWED JOURNAL ARTICLES

- Constantinos Chamzas, Zachary Kingston, Carlos Quintero-Peña, Anshumali Shrivastava, and Lydia E. Kavraki. Learning sampling distributions using local 3D workspace decompositions for motion planning in high dimensions. In *IEEE Robotics and Automation Letters*, 2020. In Review

- J3. [Zachary Kingston](#), Mark Moll, and Lydia E. Kavraki. Exploring implicit spaces for constrained sampling-based planning. *The International Journal of Robotics Research*, 38(10–11):1151–1178, 2019. doi:[10.1177/0278364919868530](https://doi.org/10.1177/0278364919868530)
- J2. Neil T. Dantam, [Zachary Kingston](#), Swarat Chaudhuri, and Lydia E. Kavraki. An incremental constraint-based framework for task and motion planning. *The International Journal of Robotics Research*, 37(10):1134–1151, 2018. doi:[10.1177/0278364918761570](https://doi.org/10.1177/0278364918761570)
- J1. [Zachary Kingston](#), Mark Moll, and Lydia E. Kavraki. Sampling-based methods for motion planning with constraints. *Annual Review of Control, Robotics, and Autonomous Systems*, 1(1):159–185, 2018. doi:[10.1146/annurev-control-060117-105226](https://doi.org/10.1146/annurev-control-060117-105226)

## BOOK CHAPTERS

- B1. [Zachary Kingston](#). *Encyclopedia of Robotics*, chapter Planning under Manifold Constraints. Springer, 2020. Accepted

## PEER-REVIEWED CONFERENCE PAPERS

- C8. [Zachary Kingston](#), Andrew M. Wells, Mark Moll, and Lydia E. Kavraki. Informing multi-modal planning with synergistic discrete leads. In *IEEE International Conference on Robotics and Automation*, pages 3199–3205, 2020
- C7. [Zachary Kingston](#), Mark Moll, and Lydia E. Kavraki. Decoupling constraints from sampling-based planners. In Nancy M. Amato, Greg Hager, Shawna Thomas, and Miguel Torres-Torriti, editors, *Robotics Research*, pages 913–928. Springer International Publishing, Cham, 2020. ISBN 978-3-030-28619-4. doi:[10.1007/978-3-030-28619-4\\_62](https://doi.org/10.1007/978-3-030-28619-4_62)
- C6. Golnaz Habibi, Sándor P. Fekete, [Zachary Kingston](#), and James McLurkin. Distributed object characterization with local sensing by a multi-robot system. In Roderich Groß, Andreas Kolling, Spring Berman, Emilio Frazzoli, Alcherio Martinoli, Fumitoshi Matsuno, and Melvin Gauci, editors, *Distributed Autonomous Robotic Systems: The 13th International Symposium*, volume 6, pages 205–218. Springer Proceedings in Advanced Robotics, 2018. doi:[10.1007/978-3-319-73008-0\\_15](https://doi.org/10.1007/978-3-319-73008-0_15)
- C5. William Baker, [Zachary Kingston](#), Mark Moll, Julia Badger, and Lydia E. Kavraki. Robonaut 2 and you: Specifying and executing complex operations. In *IEEE Workshop on Advanced Robotics and its Social Impacts*, pages 1–8, Austin, TX, March 2017. doi:[10.1109/ARSO.2017.8025204](https://doi.org/10.1109/ARSO.2017.8025204)
- C4. Neil T. Dantam, [Zachary Kingston](#), Swarat Chaudhuri, and Lydia E. Kavraki. Incremental task and motion planning: A constraint-based approach. In *Robotics: Science and Systems*, Ann Arbor, MI, June 2016. doi:[10.15607/RSS.2016.XII.002](https://doi.org/10.15607/RSS.2016.XII.002)
- C3. [Zachary Kingston](#), Neil T. Dantam, and Lydia E. Kavraki. Kinematically constrained workspace control via linear optimization. In *IEEE-RAS International Conference on Humanoid Robots*, pages 758–764, Nov 2015. doi:[10.1109/HUMANOIDS.2015.7363455](https://doi.org/10.1109/HUMANOIDS.2015.7363455)
- C2. Golnaz Habibi, [Zachary Kingston](#), Zijian Wang, Mac Schwager, and James McLurkin. Pipelined consensus for global state estimation in multi-agent systems. In *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems*, pages 1315–1323. International Foundation for Autonomous Agents and Multiagent Systems, 2015. ISBN 9781450334136. doi:[10.5555/2772879.2773320](https://doi.org/10.5555/2772879.2773320)
- C1. Golnaz Habibi, [Zachary Kingston](#), William Xie, Mathew Jellins, and James McLurkin. Distributed centroid estimation and motion controllers for collective transport by multi-robot systems. In *IEEE International Conference on Robotics and Automation*, pages 1282–1288, 2015. doi:[10.1109/ICRA.2015.7139356](https://doi.org/10.1109/ICRA.2015.7139356)

## THESES

- T1. Zachary Kingston. A unifying framework for constrained sampling-based planning. Master's thesis, Rice University, Houston, TX, 2017

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## AWARDS AND HONORS

Best Presentation in COMP 600 2018, 2020	Rice University Computer Science Department
NASA Space Technology Research Fellowship	NASA
NSF Graduate Research Fellowship Program	NSF
Graduate Research Fellowship	Rice University Computer Science Department
Distinction in Research and Creative Works	Rice University

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## TEACHING

Algorithmic Robotics COMP/ELEC/MECH 450/550 at Rice University, Houston, TX	Instructor of Record	Fall 2020	<a href="https://www.clear.rice.edu/comp450/">https://www.clear.rice.edu/comp450/</a>
Algorithmic Robotics COMP/ELEC/MECH 450/550 at Rice University, Houston, TX	Teaching Assistant	Fall 2016–2019	<a href="https://www.clear.rice.edu/comp450/">https://www.clear.rice.edu/comp450/</a>
Intro. to Computer Systems COMP 321 at Rice University, Houston, TX	In-Lab Teaching Assistant	Spring 2015, 2018	<a href="https://www.clear.rice.edu/comp321/">https://www.clear.rice.edu/comp321/</a>
Intro. to Computational Thinking COMP 140 at Rice University, Houston, TX	In-Class Teaching Assistant	Fall 2015	
Intro. to Engineering Systems ENGI 128 at Rice University, Houston, TX	Teaching Assistant	Fall 2014	<a href="https://www.clear.rice.edu/engi128/">https://www.clear.rice.edu/engi128/</a>

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## PROFESSIONAL SERVICE

Core Contributor to the <i>MoveIt</i> Robot Motion Planning Software	Mar. 2019 – Jun. 2020
Maintainer of the <i>MoveIt</i> Robot Motion Planning Software	Sep. 2018 – Mar. 2019
Referee for the Following:	
✦ IEEE/ASME Transactions on Mechatronics, 2020	
✦ IEEE Transactions on Automation Science and Engineering (T-ASE), 2020	
✦ IEEE Robotics and Automation Letters (RA-L), 2020	
✦ Workshop on the Algorithmic Foundations of Robotics (WAFR), 2020	
✦ IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020	
✦ IEEE International Conference on Robotics and Automation (ICRA), 2018	
✦ International Symposium on Robotics Research (ISRR), 2017	

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## OTHER SERVICE

Computer Science Representative for the Graduate Student Association	Mar. 2018 – May 2020
Consultant for Rice's <a href="#">Center for Academic and Professional Communication</a>	Aug. 2018 – May 2019
Treasurer for Computer Science Graduate Student Association	Aug. 2017 – May 2019

## INVITED TALKS

HUMANOID USERS CONFERENCE

Jan. 2015 – May 2015

at NASA JSC Title: *Robonaut 2 and You: Specifying and Executing Complex Operations*

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## OUTREACH

MUSEUM EXHIBIT Consultant

Jan. 2015 – May 2015

at the Museum of Science and Industry, Chicago, IL

<http://www.msichicago.org/.../robot-revolution/>

SUMMER SWARM CAMP Summer Camp Staff

Jul. 2014

at Rice University, Houston, TX

<http://mrsl.rice.edu/robot-camp>

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## OPEN SOURCE SOFTWARE

*The Open Motion Planning Library*

<http://ompl.kavrakilab.org/>

*MoveIt Robot Motion Planning Software*

<http://moveit.ros.org/>