

Dr. Khen Elimelech

ד"ר חן אלימלך

Information

Born	1994
Email	<i>khen.elimelech@rice.edu</i>
Personal website	<i>www.khen.io</i>
Mailing address	3053 Duncan Hall, Rice University, Houston, Texas 77005, USA
Languages	English (fluent), Hebrew (native), Spanish (intermediate), French (intermediate)

Academic Positions and Education

Postdoctoral Research Associate, Department of Computer Science, **Since Aug. 2021**
Rice University, Texas, USA

Working with [Lydia E. Kavradi](#) in the Kavradi Lab,
and [Moshe Y. Vardi](#) in the Computer-Aided Verification and Reasoning group (CAVR)

Ph.D., Robotics and Autonomous Systems Program, **Nov. 2017–Jul. 2021**
Technion – Israel Institute of Technology, Israel

Supervised by [Vadim Indelman](#) in the Autonomous Navigation and Perception Lab (ANPL)

Master, Robotics and Autonomous Systems Program, **Oct. 2014–Oct. 2017**
Technion – Israel Institute of Technology, Israel

Supervised by [Vadim Indelman](#) in the Autonomous Navigation and Perception Lab (ANPL)
· Completed while serving as a full-time Navy officer

B.Sc., Applied Mathematics, **Oct. 2009–Oct. 2012**
Bar-Ilan University, Israel

· Completed while in high-school (began studies at age fifteen)

Academic Teaching Experience

Primary instructor, “Algorithmic Robotics” (COMP/ELEC/MECH 450/550), *Rice Uni.*, Fall 2023

· Responsible for all teachings of ~50 undergraduate and graduate students [teaching evaluations available]

Additional Professional Experience

Founder and President, **Since Nov. 2021**
Rice University Postdoctoral Association (RPA)

· Institute-wide organization aimed to empower and support postdoctoral researchers

Software Team Leader, **Dec. 2015–Oct. 2017**
Israeli Navy

· Led a team of software engineers (soldiers and officers) and served as head project architect

Software Engineer, **Jul. 2013–Dec. 2015**
Israeli Navy

· Developed military-grade real-time software systems

Mathematics Teacher, **Jan. 2011–Nov. 2012**
Mathnasium, Israel

· Taught school and high-school students with learning and behavioral disorders

Research Funding

- Co-writer of the grant proposal on “*Experience-Based Task and Motion Planning with Abstract Skills*”, PIs: Lydia Kavradi and Moshe Vardi, expected submission in 2023.

Student Mentorship

- Hedinn Steingrímsson, Rice University, 2023
- Yuliia Suprun, Computer Science, Rice University, 2022-2023
- Clayton Ramsey, Computer Science, Rice University, 2022

Awards and Recognitions

- IEEE Robotics and Automation Society (RAS) Travel Grant for young professionals, May 2023
- “Outstanding Postdoctoral Research Award” finalist, School of Engineering, Rice University, Feb. 2023
- Invited to participate in the “Ignite Entrepreneurship Trek” summit, Silicon Valley, Dec. 2022
- Outstanding Ph.D. Research Award, Israeli Smart Transportation Research Center (ISTRC) [national award, 10,000NIS monetary prize], Sep. 2021
- Recognized as “Top Intel A.I. Student Ambassador”, Dec. 2019
- Recognized as “Robotics: Science and Systems (R:SS) Pioneer”, Jun. 2019
- Intel A.I. Travel Award, May 2019
- Intel A.I. Student Ambassador (int’l scholarship program for students in A.I.), Oct. 2017–Jul. 2021
- IEEE Robotics and Automation Society (RAS) Travel Award, May 2017
- Israeli Association for Automatic Control (IAAC) Travel Award, Mar. 2017
- Israeli Navy Excellence Award (Colonel Recognition), May 2016
- Student-Solider Scholarship, Technion, 2014-2016

Invited Talks and Presentations

- University of Maryland, College Park, Maryland, USA, Dec, 2023 (expected)
- Robotics Colloquium, Worcester Polytechnic Institute (WPI), Worcester, MA, USA, Nov. 2023
- CS Graduate Seminar, Texas A&M, College Station, TX, USA, Oct. 2023
- Workshop on “Compositional Robotics: Mathematics and Tools” at ICRA, London, UK, May 2023
- Robotics and State Estimation Lab, University of Washington, Mar. 2023
- Texas Regional Robotics Symposium (TEROS), The University of Texas at Austin, Apr. 2022
- Logic and Algorithms for Programming Intelligent Systems (LAPIS), Rice University, Oct. 2021
- Collaborative Robotics and Intelligent Systems (CoRIS) Institute, Oregon State University, Aug. 2020
- Computational Geometry and Robotics Seminar, Tel-Aviv University, Dec. 2019
- Intel A.I. DevCon (Student Ambassador Summit), San-Francisco, USA, May 2018

Outreach

- Mentor, Science Abroad, 2022
- Judge, SCI Colloquium, Rice University, Aug. 2022
- Mentor (for students in robotics from underrepresented groups), “Inclusion@RSS”, Jun. 2019
- Mentor, Israeli Navy Data Science Hackathon, Aug. 2018

Professional Service

Workshop organization

- “*Compositional Robotics: Mathematics and Tools*”, ICRA 2024
- “*Task and Motion Planning: from Theory to Practice*”, IROS 2023
- “*Evaluating Motion Planning Performance: Metrics, Tools, Datasets, and Experimental Design*”, IROS 2022
- “*Debates on the Future of Robotics Research*”, ICRA 2022
- “*Pioneers Workshop*”, R:SS 2020

As a reviewer/program committee member

- IEEE Transactions on Robotics (T-RO)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- International Symposium on Robotics Research (ISRR)
- AAAI Conference on Artificial Intelligence (AAAI)
- International Conference on Control, Decision and Information Technologies (CoDIT)
- Workshop on Generalization in Planning (GenPlan)

As an associate editor/senior program committee member

- “Pioneers Workshop”, Robotics: Science and Systems (R:SS), 2021 [“expert reviewer”]

As a session chair/co-chair

- Workshop on the Algorithmic Foundations of Robotics (WAFR), 2022 [co-chair]

Professional Societies

- Member of IEEE Robotics and Automation Society (RAS)
- Member of the Israeli Association for Artificial Intelligence (IAAI)

In the Media

- Press feature (Research in the Kavraki Lab), Rice University Magazine, Jul. 2023
 - <https://csweb.rice.edu/news/kavraki-lab-presents-four-papers-icra-2023-london>
- Radio interview (Ph.D. Research) [by Prof. Vadim Indelman], “Knowledgeable Three”/“שלושה שידועים” program on “Kan”/“כאן” Israeli radio, Jul. 2022
 - [Timestamp: 1:32:30] <https://www.kan.org.il/radio/item.aspx?pid=254625>
- Press feature (Ph.D. Research), Technion Magazine, Jul. 2022
 - [Hebrew] <https://www.technion.ac.il/?p=50809>
 - [English] <https://www.technion.ac.il/en/2022/07/autonomous-decision-making-uncertainty>
- Interview (personal life and role as an A.I. Student Ambassador), Intel Developer Magazine, Mar. 2018
 - <https://www.intel.com/content/www/us/en/developer/articles/community/ai-student-ambassador-khen-elimelech-autonomous-decision-making-in-real-time.html>

Military Service

Officer (Captain סרן) [Voluntary service שירות קבע], <i>Classified Technological Unit, Israeli Navy</i>	Dec. 2015–Oct. 2017
Officer (Lieutenant סגן), <i>Classified Technological Unit, Israeli Navy</i>	Jul. 2014–Dec. 2015
IDF officer training (קורס קצינים)	Jan. 2014–Jun. 2014
Solider, <i>Classified Technological Unit, Israeli Navy</i>	Jul. 2013–Dec. 2013
Flight cadet (קורס טיס), <i>Israeli Air Force</i>	Jan. 2013–Jun. 2013

Noteworthy Personal Activities

- Traveled to over 30 countries
- Former volunteer at Magen David Adom (Israel emergency service)

Publications

In Preparation

- [I1] K. Elimelech, M. Lahijanian, L. E. Kavraki, and M. Y. Vardi, “Falsification of autonomous systems with learned controllers,” in *TBD*, in preparation, Dec. 2023.

Submitted

- [S2] K. Elimelech, Z. Kingston, W. Thomason, M. Y. Vardi, and L. E. Kavraki, “Accelerating long-horizon planning with affordance-directed dynamic grounding of abstract skills,” in *IEEE International Conference on Robotics and Automation (ICRA)*, May 2024.
- [S1] K. Elimelech and V. Indelman, “Efficient belief space planning in high-dimensional state spaces using PIVOT: Predictive Incremental Variable Ordering Tactic,” *Major Journal*, May 2021.

Journal Articles

- [J2] K. Elimelech and V. Indelman, “Simplified decision making in the belief space using belief sparsification,” *International Journal of Robotics Research (IJRR)*, vol. 41, no. 5, pp. 470–496, 2022, initially submitted Dec. 2018. DOI: 10.1177/02783649221076381.
- [J1] K. Elimelech and V. Indelman, “Efficient modification of the upper triangular square root matrix on variable reordering,” *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 2, pp. 675–682, Apr. 2021, also selected for presentation at ICRA 2021, ISSN: 2377-3766. DOI: 10.1109/LRA.2020.3048663.

In Conference Proceedings

- [P7] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Extracting generalizable skills from a single plan execution using abstraction-critical state detection,” in *IEEE International Conference on Robotics and Automation (ICRA)*, London, UK, May 2023.
- [P6] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Efficient task planning using abstract skills and dynamic road map matching,” in *International Symposium on Robotics Research (ISRR)*, Geneva, Switzerland, Sep. 2022.
- [P5] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Automatic cross-domain task plan transfer by caching abstract skills,” in *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, College Park, MD, USA, Jun. 2022.
- [P4] K. Elimelech and V. Indelman, “Introducing PIVOT: Predictive Incremental Variable Ordering Tactic for efficient belief space planning,” in *International Symposium on Robotics Research (ISRR)*, Hanoi, Vietnam, Oct. 2019.
- [P3] K. Elimelech and V. Indelman, “Fast action elimination for efficient decision making and belief space planning using bounded approximations,” in *International Symposium on Robotics Research (ISRR)*, Puerto Varas, Chile, Dec. 2017.
- [P2] K. Elimelech and V. Indelman, “Scalable sparsification for efficient decision making under uncertainty in high dimensional state spaces,” in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, Sep. 2017, pp. 5668–5673. DOI: 10.1109/IROS.2017.8206456.
- [P1] K. Elimelech and V. Indelman, “Consistent sparsification for efficient decision making under uncertainty in high dimensional state spaces,” in *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 2017, pp. 3786–3791. DOI: 10.1109/ICRA.2017.7989437.

In Collections (Book Chapters)

- [C4] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Efficient task planning using abstract skills and dynamic road map matching,” in *Robotics Research*, ser. Springer Proceedings in Advanced Robotics (SPAR), A. Billard, T. Asfour, and O. Khatib, Eds., vol. 27, Cham, Switzerland: Springer International Publishing, 2023, pp. 487–503, ISBN: 978-3-031-25554-7. DOI: 10.1007/978-3-031-25555-7_33.
- [C3] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Automatic cross-domain task plan transfer by caching abstract skills,” in *Algorithmic Foundations of Robotics XV*, ser. Springer Proceedings in Advanced Robotics (SPAR), S. M. LaValle, J. M. O’Kane, M. Otte, D. Sadigh, and P. Tokekar, Eds., vol. 25, Cham, Switzerland: Springer International Publishing, 2023, pp. 470–487, ISBN: 978-3-031-21090-7. DOI: 10.1007/978-3-031-21090-7_28.

- [C2] K. Elimelech and V. Indelman, “Introducing PIVOT: Predictive Incremental Variable Ordering Tactic for efficient belief space planning,” in *Robotics Research*, ser. Springer Proceedings in Advanced Robotics (SPAR), T. Asfour, E. Yoshida, J. Park, H. Christensen, and O. Khatib, Eds., vol. 20, Cham, Switzerland: Springer International Publishing, 2022, pp. 85–101, ISBN: 978-3-030-95459-8. DOI: 10.1007/978-3-030-95459-8_6.
- [C1] K. Elimelech and V. Indelman, “Fast action elimination for efficient decision making and belief space planning using bounded approximations,” in *Robotics Research*, ser. Springer Proceedings in Advanced Robotics (SPAR), N. M. Amato, G. Hager, S. Thomas, and M. Torres-Torriti, Eds., vol. 10, Cham, Switzerland: Springer International Publishing, 2020, pp. 843–858, ISBN: 978-3-030-28619-4. DOI: 10.1007/978-3-030-28619-4_58.

In Professional Workshops (Peer-Reviewed Non-Archival Proceedings)

- [W5] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Extracting generalizable skills from a single plan execution using abstraction-critical state detection,” in *Workshop on Mobile Manipulation and Embodied Intelligence (MOMA): Challenges and Opportunities, in conjunction with IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Kyoto, Japan, Oct. 2022.
- [W4] K. Elimelech, L. E. Kavraki, and M. Y. Vardi, “Automatic cross-domain task plan transfer by caching abstract skills,” in *Workshop on Generalization in Planning (GenPlan), in conjunction with International Joint Conference on Artificial Intelligence (IJCAI)*, Vienna, Austria, Jul. 2022.
- [W3] K. Elimelech and V. Indelman, “Efficient belief space planning using sparse approximations,” in *Pioneers Workshop, in conjunction with Robotics: Science and Systems (R:SS)*, Freiburg, Germany, Jun. 2019.
- [W2] K. Elimelech and V. Indelman, “PIVOT: Predictive incremental variable ordering tactic for efficient belief space planning,” in *Workshop on Toward Online Optimal Control of Dynamic Robots, in conjunction with IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 2019.
- [W1] K. Elimelech and V. Indelman, “A sparsification method for efficient decision making under uncertainty in high dimensional state spaces,” in *Israel Annual Conference on Aerospace Sciences (IACAS)*, Tel Aviv, Israel, Mar. 2017.

Theses

- [T1] K. Elimelech, “Efficient decision making under uncertainty in high-dimensional state spaces,” Ph.D. dissertation, Technion – Israel Institute of Technology, Jun. 2021.