

Kiril Solovey

CURRICULUM VITÆ

PERSONAL INFORMATION

Address: 496 Lomita Mall, William F. Durand Building, Rm. 009,
Department of Aeronautics & Astronautics, Stanford University, CA
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Research Interests: Algorithmic aspects of robotics, motion planning, sampling-based algorithms, multi-robot systems, autonomous mobility on demand, computational geometry

EDUCATION AND ACADEMIC POSITIONS

- 2018–present** Department of Aeronautics & Astronautics, Stanford University, CA.
Postdoctoral Scholar, Autonomous Systems Laboratory; PI: Prof. Marco Pavone.
- 2013–2018** Ph.D. in Computer Science, Tel-Aviv University, Israel.
Dissertation Topic: “Multi-Robot Motion Planning: Theory and Practice”;
Advisor: Dan Halperin.
- 2010–2013** M.Sc. in Computer Science, **magna cum laude**, Tel-Aviv University, Israel.
Dissertation Topic: “ k -Color Multi-Robot Motion Planning”; Advisor: Dan Halperin.
- 2007–2010** B.Sc. in Computer Science, **magna cum laude**, Tel-Aviv University, Israel.

TEACHING EXPERIENCE

- 2012–2018** *Teaching assistant*, “Computer Architecture”, Tel Aviv University (TAU): Sole TA of 140 students per semester. Responsible of teaching recitations, office hours, course design, etc.
- 2018** *Teaching assistant*, “Algorithmic Robotics and Motion Planning”, TAU.
- 2013** *Teaching assistant*, “Workshop in Robot Motion Planning”, TAU.
- 2009–2012** *Grader*, various courses in computer science, TAU.

HONORS AND AWARDS

- 2018** RSS Pioneers travel grant, *Robotics: Science and Systems Foundation*
- 2018** **Fulbright Post-doctoral Scholar Award** (\$47,500), *United States-Israel Educational Foundation (USIEF)*
- 2015-18** **Clore Scholars Programme** (\$87,000), *Clore Israel Foundation*
- 2017** **Best paper award**, for “Scalable Asymptotically-Optimal Multi-Robot Motion Planning”, *International Symposium on Multi-Robot and Multi-Agent Systems*
- 2016** List of top 100 teaching assistants, *Tel-Aviv University (TAU)*
- 2016** Excellence in teaching award, School of Computer Science, TAU
- 2015** Rector’s excellence in teaching award, TAU
- 2015** **Best student paper award**, and finalist for best paper, for “On the Hardness of Unlabeled Multi-Robot Motion Planning”, *Robotics: Science and Systems* conference
- 2014,15** Internship Grant, Ministry of Science, Technology, and Space, Israel
- 2015** Deutsch Prize, *School of Computer Science, TAU*
- 2011,13,14** Excellence Scholarship, *Selim and Rachel Benin Scholarship Fund*.
- 2014** Aharon and Ephraim Katzir Travel Grant of the *Batsheva de Rothschild Fund*
- 2014** Prof. Rahamimoff Travel Grant for Young Scientists of the *US-Israel Binational Science Foundation* (declined)
- 2012** Intel Award, *Intel, Israel*
- 2011** Excellence Scholarship in Memory of Brucker Haim, *Faculty of Exact Sciences, TAU*
- 2010** Yearly Stipend for Promising M.Sc. Students, *School of Computer Science, TAU*
- 2010** Dean’s Honor List, *Faculty of Exact Sciences, TAU*
- 2009** Excellence Award for B.Sc. students, *School of Computer Science, TAU*

PUBLICATIONS

JOURNAL PAPERS

1. **Kiril Solovey** and Michal Kleinbort,
“The Critical Radius in Sampling-based Motion Planning.”
Special issue (**invited**), *International Journal of Robotics Research*, 2019 (to appear).
2. Michal Kleinbort, **Kiril Solovey**, Zakary Littlefield, Kostas E. Bekris, and Dan Halperin,
“Probabilistic completeness of RRT for geometric and kinodynamic planning with forward propagation.”
IEEE Robotics and Automation Letters, 2018.
3. Andrew Dobson, **Kiril Solovey**, Rahul Shome, Dan Halperin, and Kostas E. Bekris,
“Scalable Asymptotically-Optimal Multi-Robot Motion Planning.”
Special issue (**invited**), *Autonomous Robots*, 2018.
4. Aviel Atias, **Kiril Solovey**, Oren Salzman, and Dan Halperin,
“Effective Metrics for Multi-Robot Motion-Planning.”
Special issue (**invited**), *International Journal of Robotics Research*, 2018.
5. **Kiril Solovey**, Oren Salzman and Dan Halperin,
“New Perspective on Sampling-Based Motion Planning via Random Geometric Graphs.”
Special issue (**invited**), *International Journal of Robotics Research*, 2018.
6. **Kiril Solovey** and Dan Halperin,
“On the Hardness of Unlabeled Multi-Robot Motion Planning.”
Special issue (**invited**), *International Journal of Robotics Research*, 35(14): 1750-1759, 2016.

7. Oren Salzman, **Kiril Solovey** and Dan Halperin,
“Motion Planning for Multi-Link Robots by Implicit Configuration-Space Tiling.”
IEEE Robotics and Automation Letters, 1(2): 760-767, 2016.
8. **Kiril Solovey***, Oren Salzman* and Dan Halperin (* equal contribution),
“Finding a Needle in an Exponential Haystack: Discrete RRT for Exploration of Implicit Roadmaps in Multi-Robot Motion Planning.”
Special issue (**invited**), *International Journal of Robotics Research*, 35(5): 501-513, 2016.
9. Aviv Adler, Mark de Berg, Dan Halperin and **Kiril Solovey** (alphabetical order),
“Efficient Multi-Robot Motion Planning for Unlabeled Discs in Simple Polygons.”
Special issue (**invited**), *Transactions on Automation Science and Engineering*, 12(4): 1309-1317, 2015.
10. **Kiril Solovey** and Dan Halperin,
“ k -Color Multi-Robot Motion Planning.”
Special issue (**invited**), *International Journal of Robotics Research*, 33(1): 82-97, 2014.

PEER-REVIEWED CONFERENCE PROCEEDINGS

1. Michal Kleinbort, **Kiril Solovey**, Zakary Littlefield, Kostas E. Bekris, and Dan Halperin,
“Probabilistic completeness of RRT for geometric and kinodynamic planning with forward propagation.”
In *International Conference on Robotics and Automation*, Montreal, QC, Canada, 2019.
2. Rahul Shome, **Kiril Solovey**, Jingjin Yu, Dan Halperin and Kostas Bekris,
“Fast, High-Quality Dual-Arm Rearrangement in Synchronous, Monotone Tabletop Setups.”
In *Workshop on the Algorithmic Foundations of Robotics*, Universidad Politecnica de Yucatan, Merida, Mexico, 2018.
3. **Kiril Solovey** and Michal Kleinbort,
“The Critical Radius in Sampling-based Motion Planning.”
In *Robotics: Science and Systems*, Carnegie Mellon University, PA, USA, 2018.
4. Andrew Dobson, **Kiril Solovey**, Rahul Shome, Dan Halperin, and Kostas E. Bekris,
“Scalable Asymptotically-Optimal Multi-Robot Motion Planning.”
In *International Symposium on Multi-Robot and Multi-Agent Systems*, **best paper award**, 2017.
5. **Kiril Solovey** and Dan Halperin,
“Efficient sampling-based bottleneck pathfinding over cost maps.”
In *International Conference on Intelligent Robots and Systems*, Vancouver, BC, Canada, 2017.
6. Aviel Atias, **Kiril Solovey** and Dan Halperin,
“Effective Metrics for Multi-Robot Motion-Planning.”
In *Robotics: Science and Systems*, MIT, MA, USA, 2017.
7. **Kiril Solovey** and Dan Halperin,
“Asymptotically-Optimal Bottleneck Pathfinding with Applications to Fréchet-Type Optimization.”
In *European Symposium on Algorithms*, 76:1-76:16, Aarhus, Denmark, 2016.
8. **Kiril Solovey**, Oren Salzman and Dan Halperin,
“New Perspective on Sampling-Based Motion Planning via Random Geometric Graphs.”
In *Robotics: Science and Systems*, University of Michigan, MI, USA, 2016.
9. **Kiril Solovey**, Jingjin Yu, Or Zamir and Dan Halperin,
“Motion Planning for Unlabeled Discs with Optimality Guarantees.”
In *Robotics: Science and Systems*, Sapienza University of Rome, Italy, 2015.

10. **Kiril Solovey** and Dan Halperin,
 “On the Hardness of Unlabeled Multi-Robot Motion Planning.”
 In *Robotics: Science and Systems*, **finalist for best paper, and winner of best student paper**, Sapienza University of Rome, Italy, 2015. Also in *International Symposium on Computational Geometry, Young Researchers Forum*, Eindhoven, The Netherlands, 2015.
11. Aviv Adler, Mark de Berg, Dan Halperin and **Kiril Solovey** (alphabetical order),
 “Efficient Multi-Robot Motion Planning for Unlabeled Discs in Simple Polygons.”
 In *Workshop on Algorithmic Foundations of Robotics*, p 1-17, Istanbul, Turkey, 2014. Also in *European Workshop on Computational Geometry*, Ein Gedi, Israel, 2014.
12. **Kiril Solovey***, Oren Salzman* and Dan Halperin (* equal contribution),
 “Finding a Needle in an Exponential Haystack: Discrete RRT for Exploration of Implicit Roadmaps in Multi-Robot Motion Planning.”
 In *Workshop on Algorithmic Foundations of Robotics*, p 591-607, Istanbul, Turkey, 2014.
13. **Kiril Solovey** and Dan Halperin,
 “ k -Color Multi-Robot Motion Planning.”
 In *Workshop on Algorithmic Foundations of Robotics*, p 191-207, Cambridge, MA, USA, 2012.

DISSERTATIONS

- **Kiril Solovey**,
 “Multi-Robot Motion Planning: Theory and Practice.”
 PhD thesis, *Tel Aviv University*, March 2018. Advisor: Dan Halperin.
- **Kiril Solovey**,
 “ k -Color Multi-Robot Motion Planning.”
 Master’s thesis, *Tel Aviv University*, February 2013. Advisor: Dan Halperin.

BOOK CHAPTERS

- **Kiril Solovey**,
 “Complexity of Planning”, Section on “Motion Planning”, in the *Encyclopedia of Robotics*, Eds. Marcelo H. Ang Jr., Oussama Khatib, and Bruno Siciliano; Section Ed. Lydia E. Kavraki. Springer Press, to appear.
- Dan Halperin, Lydia Kavraki and **Kiril Solovey** (alphabetical order),
 “Robotics”, in the *Handbook of Discrete and Computational Geometry*, Eds. Jacob E. Goodman, Joseph O’Rourke, and Csaba D. Toth. CRC Press LLC, 2017.

MANUSCRIPTS UNDER REVIEW

- **Kiril Solovey**, Mauro Salazar and Marco Pavone,
 “Scalable and Congestion-aware Routing for Autonomous Mobility-on-Demand via Frank-Wolfe Optimization.” *Robotics: Science and Systems*, 2019.

RESEARCH VISITS

- 2017** Microsoft Research, Theory Group, led by Yuval Peres, Redmond, WA, USA (two weeks).
- 2016** IEEE RAS Summer School on Multi-Robot Systems, National University of Singapore.
- 2015** Workshop on Geometric Problems on Sensor Networks and Robots, IBM Research, Yorktown Heights, NY, USA.
- 2014** Kavraki Lab, led by Lydia Kavraki, Rice University, Houston, TX, USA (three weeks).
- 2014** PRACSYS Group, led by Kostas Bekris, Rutgers University, Piscataway, NJ, USA (one week).

TALKS AND PRESENTATIONS

CONFERENCE AND WORKSHOP TALKS

- “The Critical Radius in Sampling-based Motion Planning.”
Robotics: Science and Systems and RSS Pioneers, Carnegie Mellon University, PA, USA, 2018.
- “Efficient sampling-based bottleneck pathfinding over cost maps”
International Conference on Intelligent Robots and Systems, Vancouver, BC, Canada, September 2017.
- “Applications of Random Geometric Graphs in Robot Motion Planning.”
Workshop on Random Geometric Graphs and their Applications in Complex Networks, Banff, Alberta, Canada, November 2016.
- “Asymptotically-Optimal Bottleneck Pathfinding with Applications to Fréchet-Type Optimization.”
European Symposium on Algorithms, Aarhus, Denmark, August 2016.
- “New Perspective on Sampling-Based Motion Planning via Random Geometric Graphs.”
Robotics: Science and Systems, Ann Arbor, MI, USA, June 2016.
- “On the Hardness of Unlabeled Multi-Robot Motion Planning.”
 - *Robotics: Science and Systems*, Rome, Italy, July 2015.
 - *International Symposium on Computational Geometry, Young Researchers Forum*, Eindhoven, The Netherlands, June 2015.
- “Motion Planning for Unlabeled Discs with Optimality Guarantees.”
Robotics: Science and Systems, Rome, Italy, July 2015.
- “Efficient Multi-Robot Motion Planning for Unlabeled Discs in Simple Polygons.”
 - *Workshop on Algorithmic Foundations of Robotics*, Istanbul, Turkey, August 2014.
 - *European Workshop on Computational Geometry*, Ein Gedi, Israel, March 2014.
- “Finding a Needle in an Exponential Haystack: Discrete RRT for Exploration of Implicit Roadmaps in Multi-Robot Motion Planning.”
Workshop on Algorithmic Foundations of Robotics, Istanbul, Turkey, August 2014.
- “Pebbles, Manifolds and Multi-Robot Motion Planning .”
Computational Geometry Learning Research Workshop, Berlin, Germany, December 2012.
- “ k -Color Multi-Robot Motion Planning.”
 - *Workshop on Algorithmic Foundations of Robotics*, Cambridge, MA, USA, June 2012.
 - *Israeli Conference on Robotics*, Tel Aviv, Israel, November 2013.

INVITED TALKS

- Guest lecturer at AA274, “Principles of Robotic Autonomy”, Department of Aeronautics and Astronautics, Stanford University, CA, USA, March, 2019.
- “Scalable and Congestion-aware Routing for Autonomous Mobility-on-Demand via Frank-Wolfe Optimization”. ILIAD Lab, Department of Computer Science, Stanford University, CA, USA, February, 2019.
- “The critical radius in sampling-based motion planning”
 - Carnegie Mellon University, Robotics Institute, Foundations of Robotics Seminar, Pittsburgh, PA, USA, October, 2017.
 - Stanford University, Department of Aeronautics and Astronautics, Autonomous Systems Laboratory, Stanford, CA, USA, October, 2017.
 - University of British Columbia, School of Computer Science, Vancouver, BC, Canada, September, 2017.
- “Introduction to Sampling-Based Robot Motion Planning”. Microsoft Research, Theory Group, Redmond, WA, USA, April 2017.
- “Recent Progress in Multi-Robot Motion Planning.”
 - Courses “Introduction to Robotics” and “Multi-Robot Systems”, Computer Science Department, Bar Ilan University, Ramat Gan, Israel, April 2015.
 - Group Seminar at Kavraki Lab, Rice University, Houston, TX, USA, September 2014.
 - Group Seminar at PRACSYS Group, Rutgers University, Piscataway, NJ, USA, September 2014.

COMMUNITY SERVICE

COMMITTEES AND ORGANIZATION

- Program committee, *RSS Pioneers*, Freiburg, Germany, 2019.
- Publicity chair, *International Symposium on Multi-Robot and Multi-Agent Systems*, Rutgers University, New Brunswick, NJ, USA, 2019.

CONFERENCE REVIEWER

- Robotics: Science and Systems
- IEEE/RSJ International Conference on Intelligent Robots and Systems
- IEEE International Conference on Robotics and Automation
- International Symposium on Computational Geometry
- International Workshop on the Algorithmic Foundations of Robotics
- European Symposium on Algorithms
- International Colloquium on Automata, Languages and Programming

JOURNAL REVIEWER

- IEEE Transactions on Automation Science and Engineering
- IEEE Robotics and Automation Letters
- International Journal of Robotics Research
- Journal of Computational Geometry
- IEEE Transactions on Industrial Informatics
- Artificial Intelligence Journal
- Robotica
- Journal of Field Robotics
- IEEE Transactions on Robotics

MILITARY SERVICE

2004–2007 Full mandatory army service, Human Resources Branch, Israeli Defence Force.