

# Curriculum Vitae

## Gideon Amir

Department of Mathematics,  
Bar Ilan University,  
Ramat Gan, 52900 Israel

### Personal details:

**Date of birth:** July 24, 1975  
**Phone numbers:** Work 03-5318272  
**Email address:** amirgi@macs.biu.ac.il , gidi.amir@gmail.com .

### Research interests:

Probability theory, random walks on groups, geometric group theory, amenability, automaton groups, self interacting random walks, interacting particle systems and exclusion processes, stochastic growth models, opinion dynamics, percolation and random graphs.

### Academic Education and Employment:

Associate Professor at the department of mathematics at Bar Ilan University (Oct. 2010 - present)  
Head of the Bar-Ilan financial math program.

**Post Doctorate:** Postdoctoral Fellow at the department of Mathematics at the Weizmann institute of Science (July 2010- Sep. 2010)

**Post Doctorate:** Postdoctoral Fellow at the department of mathematics at the University of Toronto (July 2007 - July 2010)

**Doctorate:** PhD in Probability from the Weizmann Institute of Science, Israel, (June 2007). PhD thesis title "Random walks, random graphs and stochastic growth models". PhD advisor: Prof. Itai Benjamini.

**Masters:** M.Sc. in Mathematics from Tel-Aviv University (2003, summa cum laude, Grade average 97). M.Sc. Thesis title "Three topics in invariant subspace theory". M.Sc. Advisor: Prof. Aharon Atzmon.

**Undergraduate studies:** B.Sc. in Mathematics from Tel-Aviv University (1993, summa cum laude, Grade average 95).

**Visiting positions:** One month at MSRI and Berkeley University at a special semester on probability. (April 2005).

### Work Experience:

**1994-1999:** IDF Intelligence Corps - Research and Development.

**2000-2001:** RichFx Ltd.- Algorithm development and programming.

**2001-2003:** Majorem Ltd. - Co-Founder and Lead Engine Developer.

### Grants:

ISF Individual Research Grant 575 , 1.10.2016 - 30.9.2020.

**Groups, group actions, random walks and inverted orbits.**

German Israeli Foundation Grant I-1363-304.6 , 1.1.2017-30.12.2019 **With L. Bartholdi**

**Geometric exponents of random walks and intermediate growth groups .**

ISF Individual Research Grant 1471 , 1.10.2011 - 30.9.2016.  
**Probabilistic methods in automaton groups.**

Young GIF Grant I-1121-304.1-2012 , 1.1.2014-30.6.2015.

**Return probabilities and compression exponents of permutational wreath products over automaton groups.**

## Graduate Students and Post-docs supervised:

10.2013 - 6.2018 Idan Alter, PhD student (joint supervision with Prof. Yoram Luzon of Bar-Ilan) **Probabilistic Models in Population Genetics.** (Starts a Post Doc at Weizmann 9.2018)

10.2017 - Chai Sarrusi, PhD student, **Exponents of random walks on groups.**

10.2017 - Nissan Bailin, MsC student **Majority Dynamics.**

10.2017 - 9.2018 Ofer Bussani, Post-Doc. (Starts Post doc at Bristol in 9.2018)

10.2017 - Rangel Baldasso, Post-Doc

9.2012 - 8.2015 - Peter Mester, Post-Doc. Currently at J.P. Morgan

## Publications and Preprints:

### Published papers

1. G. Amir: *On the joint behaviour of speed and entropy of random walks on groups.* Groups, Geometry and Dynamics Volume 11, Number 2 (2017), Pages 455-467. (1509.00256)
2. G. Amir, O. Angel and G. Kozma: *One-dimensional long-range diffusion-limited aggregation II: the transient case.* The Annals of Applied Probability, Volume 27 number 3 (2017) pages 1886-1922. (arxiv:1306.4654).
3. G. Amir and B. Virag: *Speed exponents of random walks on groups* International Mathematics Research Notices, 2017, Volume 9 Pages 2567 - 2598. (1203.6226)
4. G. Amir: *One-dimensional long-range diffusion-limited aggregation III - The limit aggregate .* Annales de l'Institut Henri Poincar, Probabilits et Statistiques, Volume 53, Number 4 (2017) pages 1513-1527. (arxiv:0911.0122).
5. G. Amir, N. Berger and T. Orenshtein: *Zero-One Law for Directional Transience of One Dimensional Excited Random Walks.* Annales de l'Institut Henri Poincar Volume 52, Number 1 (2016), 47-57. (arXiv:1304.7287)
6. G. Amir and T. Orenshtein: *Excited Mob Stochastic Processes and their Applications,* Volume 126 Number 2 (2016) pages 439-469. (1307.6052)
7. G. Amir, O. Angel, N. Matte Bon and B. Virag: *The Liouville property for groups acting on rooted trees* Annales de l'Institut Henri Poincar Vol 51, Number 4(2016), Pages 1763-1783. (arXiv:1307.5652)
8. G. Amir, O. Angel, I. Benjamini and G. Kozma: *One-dimensional long-range diffusion-limited aggregation I.* Annals of Probability Vol 44, Number 5 (2016) Pages 3546-3579.(arxiv:0910.4416).
9. G. Amir and B. Virag: *Positive speed for high-degree automaton groups* Groups, Geometry, and Dynamics Volume 8, Issue 1, 2014, pp. 2338 (arxiv:1102.4979).
10. G. Amir, O. Angel and B. Virag: *Amenability of linear-activity automaton groups.* Journal of the European Mathematical Society, Volume 15, Issue 3, 2013, pp. 705-730 (arxiv:0905.2007)

11. G. Amir, I. Corwin and J. Quastel: *Probability Distribution of the Free Energy of the Continuum Directed Random Polymer in 1+1 dimensions*. Communications in Pure and Applied Math , Vol 64: 466-537, 2011. (arxiv:1003.0443)
12. G. Amir, O. Angel and B. Valko: *The TASEP speed process*. Annals of Probability 2011, Vol. 39, No. 4, 1205-1242. (arxiv:0811.3706) ()
13. G. Amir, O. Gurel-Gurevich, E. Lubetzky and A. Singer: *Giant components in biased graph processes*. Indiana University Mathematics Journal 12/2010; 59(6):1893-1930. (arxiv:0511526)
14. G. Amir and O. Gurel Gurevich: *On Fixation of Activated Random Walks* Electronic Communications in Probability, Vol. 15 (2010) 119-123. (arxiv:0910.3730)
15. G. Amir and O. Gurel-Gurevich: *The diameter of random cayley graphs on  $Z_q$* . "Groups – Complexity – Cryptology", Vol. 2 (2010) no. 1, 59-66. (arxiv:0609620).
16. G. Amir and C. Hoffmann: *A special set of exceptional times for dynamical random walk on  $\mathbb{Z}^2$* . Electronic Journal of Probability; Vol. 13 (2008) paper 63, pages 1927-1951. (arxiv:0609267).
17. G. Amir, I. Benjamini and G. Kozma: *Excited random walk against a wall*. Probability Theory and Related Fields, Volume 140 1-2, January 2008, p83-102. (arxiv:0509464).

## Accepted under revision

18. G. Amir, O. Angel and A.E. Holroyd *Multicolour Poisson Matching*, Accepted under minor revision to the Annales de l'Institut Henri Poincar. (arXiv:1605.06485).
19. G. Amir, I. Benjamini, O. Gurel-Gurevich and G. Kozma: *Random Walk in Changing Environment*, Accepted under minor revision to Stochastic Processes and their Applications. (arXiv:1504.04870).

## Preprints

20. I. Alter and G. Amir: *The Mutating Contact Process: Model Introduction and Qualitative Analysis of Phase Transitions in its Survival* (arXiv:1801.01530).
21. G. Amir and G. Kozma: *Every exponential group supports a positive harmonic function* (arXiv:1711.00050).
22. G. Amir and G. Kozma *Groups with minimal harmonic functions as small as you like (With an appendix by Nicolas Matte Bon)* (arXiv:1605.07593).
23. G. Amir and E. Lubetzky: *On two biased graph processes*. (arxiv:0608097).

## Non - mathematical paper:

24. G. Amir and R. Axelrod: *Architecture and Techniques for an MMORTS. Massively Multiplayer Game Development 2* (Charles River Media, 2005)

## Selected lectures:

1. Invited talk on "Geometric exponents of random walks on groups (tentative title)" at "World Congress of Probability and Statistics", University of Toronto, Canada, July 2016
2. Invited talk on "harmonic functions on groups" at " Random Spatial Processes and Dynamics", Texas A&M, Texas, April 2016
3. Invited talk on "slowly growing harmonic functions on groups" at "Random walks and harmonic functions on groups", Bernoulli Center, Lausanne, Dec 2015
4. Invited talk on "speed and entropy of random walks on groups" at Workshop "Mostly Markov Mixing", Technion, Haifa, Sep 2015
5. Invited talk on "The speed process of the Totally Asymmetric Zero-Range Processes", at the Mathematical physics on Fridays seminar , Tel-Aviv, May 2015,
6. Invited talk on " Amenability, entropy and the Liouville property for automaton groups via random walks and electrical networks." at the Horowitz seminar, Tel-Aviv university, April 2015
7. Invited talk on " Amenability, entropy and the Liouville property for automaton groups via random walks and electrical networks." at the Technion probability seminar, Haifa, March 2015
8. Invited talk on "automaton groups and related constructions" at Yunction Now wondering seminar, Weizmann institute, Rehovot, Feb 2015,
9. Invited talk on "A continuum of exponents for the rate of escape of random walks on groups." at the Ben-Gurion probability seminar, March 2014,
10. Invited talk on "Speed exponents of random walks on groups" at Workshop on "Groups acting on trees and around", Institute Henry Poincare, Paris, Feb 2014
11. Invited talk on "The speed process of the Totally Asymmetric Zero-Range Processes" at Probability and Stochastic Processes seminar, Technion, Nov 2013
12. Invited talk on "Multiple excited random walk, excited Mob and leftover environments" at the Horowitz seminar, Tel-Aviv university, April 2013.
13. Invited talk on "Speed exponents of random walks on groups" at Stochastic Analysis Seminar, University of Oxford, Feb 2013
14. Invited talk on "The TASEP speed process" at Particle systems and PDE's, Minho University, Braga , Portugal, Dec 2012
15. Invited talk on "Multiple excited random walkers and leftover environments" at Developments in Coupling workshop , York University, York, Sep 2012.
16. Invited talk on "A continuum of exponents for the rate of escape of random walks on groups" at the Horowitz seminar, Tel-Aviv university, Jan 2012.
17. Invited talk on "Speed exponents of random walks on groups" at Action Now workshop, Beer-Sheva, Dec 2011
18. Invited talk on "A continuum of exponents for the rate of escape of random walks on groups" at the Weizmann GFAP seminar, Nov 2011.
19. Invited talk on "Liouville property of automaton groups" at Banff workshop on Groups, graphs and stochastic processes, Banff, June 2011
20. Invited talk on "A phase transition in the behaviour of random walks on automaton groups via resistance bounds" at the Israeli Mathematical Union annual meeting, Tel-Aviv, June 2011

21. Invited talk on "The TASEP speed process" at Technical University Budapest , Budapest, Feb 2011
22. Invited talk on "The speed process of TASEP (Totally ASymmetric Exclusion Process)" at the Combinatorics seminar, Jerusalem, Nov 2010,
23. Invited talk on "Liouville, amenability, automaton groups and random walks on discrete fractals." at the Weizmann GFAP seminar, Nov 2010.
24. Invited talk on "Fluctuations of the Weakly Asymmetric Simple Exclusion Process started with step initial conditions and the free energy of the continuum directed random polymer in  $1 + 1$  dimensions" at the Dynamics and Probability Seminar, Jerusalem, Oct 2010,
25. Invited talk on "Fluctuations of the Weakly Asymmetric Simple Exclusion Process started with step initial conditions and the free energy of the continuum directed random polymer in  $1 + 1$  dimensions" at the Israeli Mathematical Union annual meeting, Rehovot, June 2010
26. Invited talk on "Liouville, amenability, automaton groups and random walks on discrete fractals." at Math Colloquium - University of Oregon, Eugene, Feb 2010
27. Invited talk on "Liouville, amenability, automaton groups and random walks on discrete fractals", Math colloquium, Haifa, Jan 2010, and random walks on discrete fractals" at the math colloquium, Tel-Aviv University, Jan 2010.
28. Invited talk on "Liouville, amenability, automaton groups and random walks on discrete fractals" at the ergodic theory seminar, Ben-Gurion University, Jan 2010.
29. Invited talk on "Liouville Property, Amenability, Discrete Fractals and Automaton Groups" at the Probability seminar - University of Toronto, Nov 2009.
30. Invited talk on "1-Dimensional one range Diffusion Limited Aggregation(DLA)" at the Probability seminar - University of Toronto, March 2009.
31. contributed talk on "The speed process of the Totally Asymmetric Exclusion Process(TASEP)" CRM workshop on Interacting Stochastic Particle Systems , Montreal, May 2009
32. Invited talk on "The speed process of the Totally Asymmetric Exclusion Process(TASEP)" at the Probability seminar - Massachusetts Institute of Technology, Boston, April 2009
33. Invited talk on "Amenability of automata groups with linear growth automorphisms" at Workshop on Self-Similarity and Branching in Group Theory, Banff, Oct 2008.
34. contributed talk on "The speed process of the Totally Asymmetric Exclusion Process(TASEP)" at UBC Summer School in Probability, Vancouver, Canada, June 2008.
35. Invited talk on "The speed process of the Totally Asymmetric Exclusion Process(TASEP)." at Math Physics and Probability seminar - Rochester University, March 2008.
36. Invited talk on "Excited random walk against a wall " at the Probability seminar - University of Toronto, Oct 2007.
37. Invited talk on " Probability seminar - Institute Henri Poincare , Paris, April 2006.
38. Invited talk on "Excited random walk against a wall" at RDSSES/ESI Workshop on Discrete Probability , Vienna, 2006.
39. contributed talk on "1-Dimensional Diffusion Limited Aggregation" at YEP workshop on Self Similar Random Structures, Eindhoven, March 2005.

40. Invited talk on "1-Dimensional Diffusion Limited Aggregation" at IAS Combinatorics seminar, Princeton, New Jersey, March 2005.
41. Invited talk on "Excited random walk against a wall" at U.C. Berkeley Probability seminar, California, March 2004.

## 1 Additional Information

**Languages:** Hebrew (native), English (fluent).

**Programming Languages:** C, Pascal, some C++.