

Curriculum Vitae

LIONEL LEVINE

Address: 77 Massachusetts Ave., 2-335
Department of Mathematics
Massachusetts Institute of Technology
Cambridge, MA 02139

Phone: (617) 543-5410
Email Address: levine@math.mit.edu
Homepage: <http://math.mit.edu/~levine>
Citizenship: USA

Employment and Education

- 2011 – Assistant Professor of Mathematics, Cornell University (*on leave* 2011–12)
2008 – 2011 C. L. E. Moore Instructor, Department of Mathematics, MIT.
2002 – 2007 Ph. D. in Mathematics, University of California, Berkeley.
Advisor: Yuval Peres
Thesis: *Limit Theorems for Internal Aggregation Models*.
1998 – 2002 A.B. in Mathematics, Harvard University, *magna cum laude*.

As visitor:

- 2010 Spring Visiting Researcher, Microsoft Research, Redmond, WA.
1999 Fall Budapest Semesters in Mathematics, Eötvös Loránd University, Budapest, Hungary.

Grants and Awards

- 2011 – 2014 National Science Foundation Grant DMS 1105960.
2008 – 2011 National Science Foundation Postdoctoral Research Fellowship
2008 Finalist for the American Institute of Mathematics Five-Year Fellowship
2002 – 2007 National Science Foundation Graduate Research Fellowship
2000, 2002 Robert Fletcher Rogers Prize in Mathematics, awarded for best talk by an undergraduate at the Harvard Undergraduate Mathematics Colloquium
2000 – 2001 Harvard University Award Peer Tutor
2000 Derek Bok Center Certificate of Distinction in Teaching
1998 National Junior Science and Humanities Symposium Scholarship
1998 National Merit Scholarship
1997 Math Olympiad Program

Research interests

Discrete probability, statistical mechanics, algebraic combinatorics.

Publications and Preprints

- submitted 1. Lionel Levine and Yuval Peres, *Is the looping constant of the square grid $5/4$?* [arXiv:1106.2226](https://arxiv.org/abs/1106.2226)
2. Giuliano Giacaglia, Lionel Levine, James Propp and Linda Zayas-Palmer. *Local-to-global principles for rotor walk.* [arXiv:1107.4442](https://arxiv.org/abs/1107.4442)
3. Lionel Levine and Katherine E. Stange, *How to make the most of a shared meal: plan the last bite first.* [arXiv:1104.0961](https://arxiv.org/abs/1104.0961)
4. David Jerison, Lionel Levine and Scott Sheffield, *Internal DLA and the Gaussian free field.* [arXiv:1101.0596](https://arxiv.org/abs/1101.0596)
5. David Jerison, Lionel Levine and Scott Sheffield, *Internal DLA in higher dimensions.* [arXiv:1012.3453](https://arxiv.org/abs/1012.3453)
6. Tobias Friedrich and Lionel Levine, *Fast simulation of large-scale growth models.* [arXiv:1006.1003](https://arxiv.org/abs/1006.1003)

7. Christopher J. Hillar, Lionel Levine and Darren Rhea, *Equations solvable by radicals in a uniquely divisible group*. [arXiv:1004.5239](#)
- 2011 8. David Jerison, Lionel Levine and Scott Sheffield, *Logarithmic fluctuations for internal DLA*. Journal of the American Mathematical Society, to appear. [arXiv:1010.2483](#)
9. Lionel Levine, *Sandpile groups and spanning trees of directed line graphs*. Journal of Combinatorial Theory A **118** (2011) 350–364. [arXiv:0906.2809](#)
10. Lionel Levine, *Parallel chip-firing on the complete graph: devil’s staircase and Poincaré rotation number*. Ergodic Theory and Dynamical Systems **31** (2011), 891–910 [arXiv:0811.2800](#)
- 2010 11. Lionel Levine and James Propp, *What is a sandpile?* Notices of the American Mathematical Society **57** (2010), 976–979.
12. Wouter Kager and Lionel Levine, *Rotor-router aggregation on the layered square lattice*. Electronic Journal of Combinatorics **17** (2010), R152. [arXiv:1003.4017](#)
13. Wouter Kager and Lionel Levine, *Diamond aggregation*. Mathematical Proceedings of the Cambridge Philosophical Society **149** (2010), 351–372. [arXiv:0905.1361](#)
14. Lionel Levine and Yuval Peres, *Scaling limits for internal aggregation models with multiple sources*. Journal d’Analyse Mathématique **111** (2010), 151–219. [arXiv:0712.3378](#)
15. Anne Fey, Lionel Levine and David B. Wilson, *The approach to criticality in sandpiles*. Physical Review E **82** (2010), 031121. [arXiv:1001.3401](#)
16. Anne Fey, Lionel Levine and David B. Wilson, *Driving sandpiles to criticality and beyond*. Physical Review Letters **104** (2010), 145703. [arXiv:0912.3206](#)
17. Anne Fey, Lionel Levine and Yuval Peres, *Growth rates and explosions in sandpiles*. Journal of Statistical Physics **138** (2010), 143–159. [arXiv:0901.3805](#)
- 2009 18. Lionel Levine and Yuval Peres, *Strong spherical asymptotics for rotor-router aggregation and the divisible sandpile*. Potential Analysis **30** (2009), 1–27. [arXiv:0704.0688](#)
19. Itamar Landau and Lionel Levine, *The rotor-router model on regular trees*. Journal of Combinatorial Theory A **116** (2009), 421–433. [arXiv:0705.1562](#)
20. Lionel Levine, *The sandpile group of a tree*. European Journal of Combinatorics **30** (2009) 1026–1035. [arXiv:math/0703868](#)
- 2008 21. Alexander E. Holroyd, Lionel Levine, Karola Meszaros, Yuval Peres, James Propp and David B. Wilson, *Chip-firing and rotor-routing on directed graphs*, in “In and Out of Equilibrium 2,” Progress in Probability, vol. 60, 331–364. [arXiv:0801.3306](#)
22. Lionel Levine and Yuval Peres, *Spherical asymptotics for the rotor-router model in \mathbb{Z}^d* . Indiana University Mathematics Journal **57**, no. 1, 431–450. [arXiv:math/0503251](#)
- 2007 23. Christopher J. Hillar and Lionel Levine, *Polynomial recurrences and cyclic resultants*. Proceedings of the American Mathematical Society **135**, 1607–1618. [arXiv:math/0411414](#)
- 2006 24. Lionel Levine, *Fractal sequences and restricted Nim*. Ars Combinatoria **80**, 113–127. [arXiv:math/0409408](#)
- 2005 25. Lionel Levine and Yuval Peres, *The rotor-router shape is spherical*. Mathematical Intelligencer **27**, no. 3, 9–11.
- 1999 26. Lionel Levine, *Fermat’s little theorem: a proof by function iteration*. Mathematics Magazine **72**, no. 4, 308–309.

Conferences, Seminars And Colloquiua

- 2011 May Southeastern Probability Conference, Duke University.
Apr. AMS Eastern sectional meeting, special session on random processes.
Mar. Workshop on free boundary problems, MSRI, Berkeley, CA.
Mar. MIT combinatorics seminar.
Feb. Harvard probability and random matrix seminar.
Jan. University of British Columbia probability seminar.
Jan. University of British Columbia colloquium.
- 2010 Dec. University of Minnesota probability seminar.
Oct. University of Michigan combinatorics seminar.
Sept. Cornell probability seminar.
Aug. Formal Power Series and Algebraic Combinatorics, San Francisco, CA.
Apr. Microsoft Research, Redmond, WA.
Feb. IMPA probability seminar, Rio de Janeiro, Brazil.
Jan. University of Washington / PIMS mathematics colloquium.
- 2009 Nov. University of Pennsylvania combinatorics and probability seminar.
Nov. Brown University discrete math seminar.
Oct. Séminaire de combinatoire et d'informatique mathématique du LaCIM, Montreal, QC.
Oct. Dartmouth computer science colloquium.
Jul. 27th Brazilian Colloquium of Mathematics, Rio de Janeiro.
Jul. Formal Power Series and Algebraic Combinatorics, Hagenberg, Austria.
Jun. Workshop in PDE and Potential Theory, KTH Stockholm.
May CRM Workshop on New Directions in Random Spatial Processes, Montreal, QC.
Apr. NYU probability seminar.
Mar. University of Toronto probability seminar.
Mar. MIT combinatorics seminar.
- 2008 Oct. Microsoft Research, Redmond, WA.
Oct. American Mathematical Society Western Sectional Meeting, Vancouver, BC.
Aug. CRM Workshop on Laplacian Growth and Related Topics, Montreal, QC.
June Formal Power Series and Algebraic Combinatorics, Valparaiso, Chile.
Apr. Tata Institute for Fundamental Research, Mumbai, India. "Random interactions" seminar.
Feb. Brown University geometry seminar.
Feb. MIT PDE seminar.
Jan. Microsoft Research, Redmond, WA.
Jan. VU Amsterdam probability seminar.
Jan. EURANDOM probability seminar, Eindhoven, Netherlands.
- 2007 Nov. Berkeley probability seminar.
Nov. MIT combinatorics seminar.
Oct. International Symposium on Stochastic Analysis on Large Scale Interacting Systems, Fukuoka, Japan.
Sep. Workshop on Sandpile Models and Related Fields, Eindhoven, Netherlands.
Aug. Microsoft Research, Redmond, WA.
- 2006 Oct. University of Washington probability seminar.
Mar. UC Davis mathematical physics and probability seminar.
- 2005 May UCLA probability seminar.
Mar. Mathematical Sciences Research Institute probability seminar.
- 2004 June Canadian Mathematical Society Summer Meeting, Halifax, NS.

2003 Jan. National Joint Meeting of the American Mathematical Society and the Mathematical Association of America, special session on discrete models, Baltimore, MD.

Professional Activities

- Co-organizer of the special session on “Visual Mathematics: Laplacian Growth” at the 2011 AMS/MAA Joint Meetings in New Orleans, LA.
- Co-organizer of the MIT Probability Seminar.
- Journals refereed:

American Mathematical Monthly	Journal of Physics A: Mathematical and Theoretical
Annals of Combinatorics	Journal of Statistical Physics
Annals of Probability	Linear Algebra and Its Applications
Communications in Mathematical Physics	Physica A: Statistical Mechanics and Its Applications
Discrete Mathematics	Physical Review E
Electronic Journal of Combinatorics	Random Structures & Algorithms
Journal of Integer Sequences	Stochastic Processes and Their Applications
- Conferences refereed: **SODA** (2006, 2007, 2010), **STOC** (2010).

Teaching Activities

- 2011 Spring Algebraic combinatorics at MIT.
- 2009 – 2010 With Jim Propp, mentored undergraduates Giuliano Giacaglia, Damien Jiang and Linda Zayas-Palmer in the Chips and Rotors Research Initiative (CARRI), a part of MIT’s Undergraduate Research Opportunities Program.
- 2009 Winter Taught one of the ten lectures in 18.095 (Mathematics Lecture Series) at MIT.
- 2008 Fall Taught four guest lectures in Scott Sheffield’s graduate topics class in probability at MIT, covering random walks and electrical networks, uniform spanning trees, Wilson’s algorithm, loop-erased walk and convergence to SLE.
- 2005 Spring Teaching assistant for linear algebra and differential equations at UC Berkeley.
- 2004 Fall Teaching assistant for calculus at UC Berkeley.
- 2000 – 2001 Award Peer Tutor Program. Tutored Harvard undergraduates in calculus, linear algebra, group theory, mechanics, basic probability and combinatorics.
- 2000 Summer Program in Mathematics for Young Scientists, Boston University. Coached gifted high-school students in number theory.
- 2000 Spring Course assistant for elementary number theory (Math 124) at Harvard.