

# Hamed Hatami

**Born:** September 22, 1981

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## RESEARCH INTERESTS

- Applications of Mathematical Analysis in Theoretical Computer Science and Combinatorics.
- Additive Combinatorics.

## ACADEMIC EMPLOYMENT

McGill University Montreal, Canada  
Assistant Professor at School of Computer Science  
Duration: 2010- present.

Princeton University Princeton, USA  
Veblen fellow at Department of Mathematics  
Duration: 2009- 2010.

EDUCATION University of Toronto Toronto, Canada  
Ph.D. candidate in Computer Science.  
Duration: 2005- 2009.  
Supervisor: Michael Molloy and Balasz Szegedy.

University of Toronto Toronto, Canada  
Received M.Sc. in Computer Science.  
Duration: 2003-2005.  
Supervisor: Michael Molloy.  
Thesis: Randomly coloring graphs and coloring random graphs.

Sharif University of Technology Tehran, Iran  
Received B.Sc. in Computer Engineering.  
Duration: 1999-2003.

## WORK EXPERIENCE

Microsoft Research Theory Cambridge, U.S.A.  
Duration: Aug 2008 - Oct 2008.  
Summer internship.

## HONOR/AWARDS/GRANTS

- FQRNT, New Researchers start-up program, 2011-2013 (\$20,000/year)
- NSERC individual research grant, 2011-2016 (\$18,000/year)
- **Invited Speaker:** ICM2014 Satellite Conference on Extremal and Structural Graph Theory, Gyeongju, Korea, 2014
- **Invited Speaker:** *Neo-Classical Methods in Discrete Analysis* at Simons Institute, Berkeley, 2014.
- **Invited Speaker:** *Neo-Classical Methods in Discrete Analysis* at Simons Institute, Berkeley, 2013.
- **Invited Speaker:** *Functional Inequalities in Discrete Spaces with Applications* at Simons Institute, Berkeley, 2013.
- **Invited Speaker:** *Real Analysis in Testing, Learning and Inapproximability* at Simons Institute, Berkeley, 2013.
- **Invited Speaker:** *CanADAM Conference* at St John's, Newfoundland, 2013.
- **Invited Speaker:** *Graph Theory* at Mathematisches Forschungsinstitut Oberwolfach, 2013.
- **Invited Speaker:** *Conference on Graphs and Analysis* at Institute for Advanced Studies, 2012.
- **Invited Speaker:** *Analysis of Boolean functions* by Simons Foundation at US Virgin Islands, 2012.
- **Invited Speaker:** *Graph limits, Homomorphisms and Structures II* at Hranicni zamecek, 2012.
- **Invited Speaker:** Isaac Newton Institute for Mathematical Sciences, 14 June, 2011, Cambridge, UK.
- **Invited Speaker:** *Workshop on Graph Homomorphisms*, July 11- 15, 2011, Fields institute, Toronto, Canada.
- **Ostrowski Fellowship:** 25,000 Swiss Franks, 2008.
- **Invited Speaker:** Minisymposium at the SIAM Meeting on Discrete Mathematics, 2010.
- **Invited Speaker:** *Analytical Methods in Combinatorics, Additive Number Theory and Computer Science*, Institute for Pure and Applied Mathematics, Los Angeles, 2009.
- **Invited Speaker:** *Discrete Rigidity Phenomena in Additive Combinatorics* at Mathematical Sciences Research Institute, Berkeley 2008.
- **Invited Speaker:** *Geometry in the Design of Algorithms* at Princeton University, 2008.
- **Invited Speaker:** Minisymposium at the SIAM Meeting on Discrete Mathematics, 2006.
- **Invited Participant:** *Geometry and Algorithms* at the International Centre for Mathematical Sciences in Edinburgh, 2007.
- **Invited Participant:** *Graph limits, Homomorphisms and Structures* at Hranicni zamecek, 2009.
- **Reviewer:** Mathematical Reviews(MR) of American Mathematical Society.
- Gold Medal in the 8th Iranian National Informatics Olympiad (1998).

## PUBLICATIONS

Refereed publications:

1. (with James Hirst, Serguei Norine), The inducibility of blow-up graphs, *J. Combin. Theory Ser. B* 109 (2014), 196212.
2. (with Pooya Hatami, and James Hirst), Limits of Boolean Functions on  $F_p^n$ , *Electronic Journal of Combinatorics* 21(4), (2014).
3. (with Laszlo Lovasz, Balazs Szegedy), Limits of local-global convergent graph sequences, *Geometric and Functional Analysis*, 24 (2014), no. 1, 269296.
4. (with Shachar Lovett), Estimating the distance from testable affine-invariant properties, *FOCS* 2013.
5. (with Arnab Bhattacharyya, Eldar Fischer, Pooya Hatami, Shachar Lovett), Every locally characterized affine-invariant property is testable, *STOC* 2013.
6. (with Serguei Norine), The entropy of random-free graphons and properties, *Combinatorics Probability and Computing*, 22(04) (2013), pp. 517-526.
7. (with Shachar Lovett), Correlation testing for affine invariant properties on  $\mathbb{F}_p^n$  in the high error regime, *STOC* 2011: 187-194.
8. (with Anil Ada, Omar Fawzi), Spectral norm of symmetric functions, *APPROX-RANDOM* 2012: 338-349.
9. (with Jan Hladky, Daniel Kral, Serguei Norine, and Alexander Razborov), Non-three-colorable common graphs exist, *Combinatorics Probability and Computing*, 21(5) (2012), pp. 734-742.
10. (with Jan Hladky, Daniel Kral, Serguei Norine, Alexander Razborov), On the number of pentagons in triangle-free graphs, *Journal of Combinatorial Theory. Series A.*, 120(3) (2013), pp. 722-732.
11. H. Hatami, A structure theorem for Boolean functions with small total influences, *Annals of Mathematics*, (2) 176 (2012), no. 1, pp. 509-533.
12. (with Shachar Lovett), Higher-order Fourier analysis of  $F_p^n$  and the complexity of systems of linear forms, *Geometric and Functional Analysis*, to appear.
13. (with Serguei Norine), Undecidability of linear inequalities in graph homomorphism densities, *Journal of the American Mathematical Society*, 24(2) (2011) pp. 547-565.
14. (with Shachar Lovett), Correlation testing of Affine Invariant properties on  $\mathbb{F}_p^n$  in the high error regime, *The 43rd ACM Symposium on Theory of Computing (STOC 2011)*, (2011) pp. 187-194.
15. (with M. Molloy) The scaling window for a random graph with a given degree sequence, *Random Structures Algorithms* 41 (2012), no. 1, 99-123. (Presented in SODA 2010).
16. Graph norms and Sidorenko's conjecture, *Israel Journal of Mathematics*, 175(1) (2010), pp. 125-150.
17. Decision trees and influence of variables over product probability spaces, *Combinatorics Probability and Computing*, 12 pages, 18(3) (2009), pp. 357-369.
18. (with Xuding Zhu), The fractional chromatic number of graphs of maximum degree at most three. *SIAM Journal on Discrete Mathematics*. 23(4) (2009), pp. 1762-1775.
19. (with M. Ghandehari and N. Spronk), Amenability constants for semilattice algebras, *Semigroup forum*, 79(2) (2009), pp. 279-297.
20. (with A. Magen, and V. Markakis) Integrality gaps of semidefinite programs for Vertex Cover and relations to  $\ell_1$  embeddability of Negative type metrics, *SIAM Journal on Discrete Mathematics*, 23(1) (2008), pp. 178-194.

21. (with M. Ghandehari), Fourier analysis and large independent sets in powers of complete graphs, *Journal of Combinatorial Theory. Series B.* 98(1) (2008), pp. 164-172.
22. (with M. Molloy), Sharp Thresholds for Constraint Satisfaction Problem and Graph Homomorphisms, *Random Structures Algorithms.* 33(3) (2008), pp. 310-332.
23.  $\Delta + 300$  is a bound on the adjacent vertex distinguishing edge chromatic number, *Journal of Combinatorial Theory. Series B.* 95(2) (2005) pp. 246-256.
24. Random cubic graphs are not homomorphic to the cycle of size 7, *Journal of Combinatorial Theory. Series B.* 93(2) (2005) pp. 319-325.
25. A remark on Bourgain's distributional inequality on the Fourier spectrum of Boolean functions, *Online Journal of Analytic Combinatorics.* 1 (2006).
26. (with P. Hatami), Perfect dominating sets in the Cartesian products of prime cycles, *Electronic Journal of Combinatorics*, 14(1), (2007), N8.
27. (with P. Afshani), Approximation and Inapproximability Results for Maximum Clique of Disc Graphs in High Dimensions, *Information Processing Letters.* 105(3) (2008) pp. 83-87.
28. (with P. Afshani, M. Ghandehari, M. Ghandehari, R. Tusserkani, X. Zhu), Circular chromatic index of graphs of maximum degree 3, *Journal of Graph Theory.* 49(4) (2005) pp. 325-335.
29. (with R. Tusserkani), On the computational complexity of circular chromatic number, *Journal of Graph Theory.* 47(3) (2004) pp. 226-230..
30. (with M. Ghandehari and E.S. Mahmoodian), On the size of the minimum critical set of a Latin square, *Journal of Discrete Mathematics.* 293(1-3) (2005) pp. 121-127.
31. (with H. Maserrat), On the computational complexity of defining sets, *Journal of Discrete Applied Mathematics.* 149(1-3) (2005) pp. 101-110.
32. (with P. Afshani and E.S. Mahmoodian), On the spectrum of the forced matching number of graphs, *Australasian Journal of Combinatorics.* 30 (2004) pp. 147-160.
33. (with E.S. Mahmoodian), A lower bound for the size of the largest critical sets in Latin squares, *Bulletin of the Institute of Combinatorics and its Applications.* 38 (2003) pp.19-22.

Submitted:

- (with Pooya Hatami, Yaqiao Li), A characterization of functions with vanishing averages over products of disjoint sets.
- (with Yuval Filmus, Nathan Keller, Noam Lifshitz), On the sum of the L1 influences of bounded functions.
- (with Pooya Hatami, Shachar Lovett), General systems of linear forms: equidistribution and true complexity.
- (with Svante Janson, Balazs Szegedy), Graph properties, graph limits and entropy.