

Mustazee Rahman

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RESEARCH INTERESTS

Combinatorics, Probability theory, Stochastic processes.

ACADEMIC APPOINTMENTS

Instructor in Applied Mathematics, MIT, 2015–present.
Teaching Assistant, University of Toronto, 2010–2015.

EDUCATION

University of Toronto, Toronto, ON, Canada.

- PhD in Mathematics, 2015.
 - Thesis: Suboptimality of local algorithms on sparse random graphs.
 - Advisor: Bálint Virág.
- M.Sc. in Mathematics, 2011.
 - Thesis: Non-homogeneous nested recursions and trees.
 - Advisor: Stephen Tanny.
- B.Sc. in Mathematics, 2006 - 2010.

PUBLICATIONS AND PREPRINTS

1. Suboptimality of local algorithms for a class of max-cut problems (with W-K. Chen, D. Gamarnik, D. Panchenko) *submitted* (2017); arXiv:1707.05386.
2. Random sorting networks: local statistics via random matrix laws (with V. Gorin), *submitted* (2017); arXiv:1702.07895.
3. Geometry of permutation limits (with B. Virág, M. Vizer), *submitted* (2016); arXiv:1609.03891.
4. A lower bound on the spectrum of unimodular networks, *submitted* (2016); arXiv:1609.02209.
5. Brownian motion as limit of the interchange process (with B. Virág), *permanent preprint*; arXiv:1609.07745.
6. Factor of IID percolation on trees, *SIAM J. Discrete Math.* **30** no. 4 (2016), pp. 2217–2242.

7. Percolation with small clusters in random graphs, *Graphs and Combinatorics* **32** no. 3 (2016), pp. 1167–1185.
8. Local algorithms for independent sets are half-optimal (with B. Virág), *Annals of Probability* **45** no. 3 (2017), pp. 1543–1577.
9. Nested recursions, simultaneous parameters, and tree superpositions (with A. Isgur, V. Kuznetsov, S. Tanny), *Electronic Journal of Combinatorics* **21** no. 1 (2014), Article P49.
10. Solving non-homogeneous nested recursions using trees (with A. Isgur, S. Tanny), *Annals of Combinatorics* **17** no. 4 (2013), pp. 695–710.
11. A combinatorial interpretation of Hofstadter’s G -sequence, *Atlantic Electronic Journal of Mathematics* **5** no. 1 (2012), pp. 16–21.
12. On variants of Conway and Conolly’s meta-Fibonacci recursions (with A. Isgur), *Electronic Journal of Combinatorics* **18** no. 1 (2011), Article P96.
13. Spot-based generations for meta-Fibonacci sequences (with B. Dalton, S. Tanny), *Experimental Mathematics* **20** no. 2 (2011), pp. 129–137.

AWARDS AND GRANTS

NSERC Postdoctoral Fellowship, 2015–2017.

NSERC Michael Smith Foreign Study scholarship, 2014.

Visit to Alfréd Rényi Institute of Mathematics; hosted by Miklós Abért..

NSERC CGS M and CGS D scholarships (graduate), 2011–2015.

Coxeter Scholarship in mathematics (University of Toronto), 2009.

Awarded to either undergraduate or graduate students on admission to the University of Toronto or at the in-course level who demonstrate achievement in mathematics..

Hans Heilbronn Prize in mathematics (University of Toronto), 2009.

Awarded to an undergraduate student specializing in mathematics.

INVITED SEMINARS

Georgia Tech Combinatorics Seminar, 2017.

Ohio State Combinatorics and Probability Seminar, 2017.

Brown Probability Seminar, 2017.

Toronto Probability Seminar, 2017.

Princeton Discrete Math Seminar, 2016.

Cornell Probability Seminar, 2016.

MIT Combinatorics Seminar, 2016.

Brandeis Combinatorics Seminar, 2016.

Montréal Probability Seminar, 2015.

MIT Stochastic Seminar, 2015.

Groups and Graphs Seminar, Alfréd Rényi Institute of Mathematics, 2015.

Microsoft Research Seminar, Microsoft (Redmond), 2015.

Departmental Seminar, Central European University, 2014.

Toronto Probability Seminar, 2013.

INVITED CONFERENCES AND WORKSHOPS

Integrable Probability FRG meeting, Columbia University, 2017.
PCMI program on Random Matrices, PCMI, 2017.
Phase transitions in randomized computational problems, AIM, 2017.
Session on Discrete Probability, AMS sectional meeting, Fargo, 2016.
Session of Graph Theory Canadian Mathematical Society winter meeting, Montréal, 2015.
PIMS Summer School in Probability, McGill University, 2015.
Groups, Graphs and Stochastic Processes workshop, BIRS, 2015.
Ontario Combinatorics Workshop, York University, Toronto, 2014.
PIMS Summer School in Probability, University of British Columbia, 2014.
Séminaire de Mathématiques Supérieures, University of Montréal, 2012.
Mathematical Modeling in Industry XV, IMA, 2011.
Ottawa Mathematics Conference, University of Ottawa, Ottawa, 2011.
Fields Summer School on the Mathematics of Constraint Satisfaction, Fields Institute, 2011.
Canadian Undergraduate Mathematics Conference, Carleton University, Ottawa, 2009.

TEACHING EXPERIENCE

Instructor, MIT

- Combinatorial Analysis. Fall 2016 and Fall 2017.
- Seminar in Discrete Mathematics. Spring 2016, Spring 2017 and Spring 2018 .
- Recitation Instructor, Multivariable Calculus. Spring 2016.

Teaching Assistant, University of Toronto, 2010–2015.

SERVICE

Co-organizer, MIT combinatorics Seminar, MIT, 2016–present.

Co-organizer, Mathematics Graduate Student Seminar, University of Toronto, 2010–2012.

Vice-president, Mathematics Graduate Student Association, University of Toronto, 2012–2013.

SUPERVISION

MIT Undergraduate Research Opportunity Program

- Simon Zheng, Fall 2015 and Spring 2016.
- Yohan Borna-Weil, Spring 2016.
- Brice Huang, Fall 2017.