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Fields of Research Interest

Extremal and Probabilistic Combinatorics, Probability, Percolation, Graph Theory.

Education

October 2010 – October 2013: Ph.D. in Mathematics under the supervision of Prof. Béla Bollobás FRS, Trinity College, University of Cambridge. Ph.D. thesis "Extremal and Probabilistic Bootstrap Percolation".

October 2009 – June 2010: Master of Advanced Study in the field of Mathematics, University of Cambridge.

October 2002 – July 2007: Master of Science in Engineering in the field of Computer Science, Wrocław University of Science and Technology.

Academic Employment

July 2018 – Present: Research Fellow in Random Discrete Structures at the School of Mathematics at the University of Birmingham.

October 2017 – June 2018: Departmental Lecturer in Combinatorics at the Mathematical Institute, University of Oxford. Postdoctoral Research Fellow and Lecturer in Mathematics at St Anne's College, Oxford.

October 2014 – September 2017: Drapers' Junior Research Fellow in Mathematics at St Anne's College.

October 2013 – June 2014: Postdoctoral researcher, The London Institute for Mathematical Sciences (LIMS).

Publications

1. N. Fountoulakis and M. Przykucki. High-dimensional bootstrap processes in evolving simplicial complexes. *Submitted, available at arXiv: 1910.10139.*

2. M. Przykucki, A. Roberts, and A. Scott. Parking on the integers. *Submitted, available at arXiv: 1907.09437.*

3. M. Przykucki, A. Roberts, and A. Scott. Shotgun reconstruction in the hypercube. *Submitted, available at arXiv: 1907.07250.*

4. M. Przykucki and T. Shelton. Smallest percolating sets in bootstrap percolation on grids. *Submitted, available at arXiv: 1907.01940.*

5. M. Przykucki and A. Roberts. Vertex-isoperimetric stability in the hypercube. To appear in Journal of Combinatorial Theory, Series A, *available at arXiv: 1808.02572.*

6. C. Goldschmidt and M. Przykucki. Parking on a random tree. Combinatorics, Probability and Computing, 28, 23–45, 2019.

7. C. McDiarmid and M. Przykucki. On the purity of minor-closed classes of graphs. Journal of Combinatorial Theory, Series B, 135, 295–318, 2019.

8. C. McDiarmid and M. Przykucki. On the critical densities of minor-closed classes. European Journal of Combinatorics, 75, 66–91, 2019.

9. B. Bollobás, M. Przykucki. O. Riordan, and J. Sahasrabudhe. On the maximum running time of graph bootstrap percolation. The Electronic Journal of Combinatorics, 24, 1–20, 2017.

10. K. Gunderson, M. Przykucki, and S. Koch. The time of graph bootstrap percolation. Random Structures and Algorithms, 51, 143–168, 2017.

11. P. Balister, B. Bollobás, M. Przykucki, and P. Smith. Subcritical $\mathcal{U}$-bootstrap percolation models have non-trivial phase transitions. Transactions of the American Mathematical Society, 368, 7385–7411, 2016.

12. F. Benevides and M. Przykucki. Maximum percolation time in two-dimensional bootstrap percolation. SIAM Journal on Discrete Mathematics (SIDMA), 29, 224–251, 2015.

13. K. Gunderson and M. Przykucki. Lower bounds for bootstrap percolation on Galton-Watson trees. The Electronic Communications in Probability, 19, 1–7, 2014.

14. B. Bollobás, C. Holmgren, S. Janson, K. Gunderson, and M. Przykucki. Bootstrap percolation on Galton–Watson trees. The Electronic Journal of Probability, 19, 1–27, 2014.

15. F. Benevides and M. Przykucki. On slowly percolating sets of minimal size in bootstrap percolation. The Electronic Journal of Combinatorics, 20, 1–20, 2013.

16. M. Przykucki. Maximal percolation time in hypercubes under 2-bootstrap percolation. The Electronic Journal of Combinatorics, 19, 1–13, 2012.

17. M. Przykucki. Optimal stopping in a search for a vertex with full degree in a random graph. Discrete Applied Mathematics, 160, 339–343, 2012.

18. M. Przykucki and M. Sulkowska. Gusein-Zade problem for directed path. Discrete Optimization, 7 (1-2), 13–20, 2010.

19. M. Klonowski, M. Przykucki, T. Struminski, and M. Sulkowska. Practical Universal Random Sampling. Lecture Notes in Computer Science Vol. 6434, 84–100, 2010.

20. M. Klonowski, M. Przykucki, and T. Struminski. Data Deletion with Time–Aware Adversary Model. In Proceedings of CSE (2), 659–664, 2009.

21. M. Klonowski, M. Przykucki, and T. Struminski. Data Deletion with Provable Security. Lecture Notes in Computer Science Vol. 5379, 240–255, 2008.

Grants, Prizes & Scholarships

Departmental Teaching Award, Mathematical Institute, University of Oxford, 2018.

London Mathematical Society Early Career Researcher Travel Grant, 2017.

Smith–Rayleigh–Knight Essay Prize (Group 1), (Essay "Extremal problems in bootstrap percolation: maximal percolation time"), University of Cambridge, 2012.

Trinity College Senior Scholarship, University of Cambridge, 2010.

Polish Mathematical Society's Prize for Student's Research in Mathematics, 2007.

Conference and Seminar Presentations

Parking on the integers, Combinatorics Seminar, Umeå University, Sweden, 2019.

Parking on the integers, 19th International Conference on Random Structures and Algorithms RS&A2019, Zürich, Switzerland, 2019.

Parking on the integers, Combinatorics Seminar, University of Birmingham, Birmingham, UK, 2019.

Shotgun assembly of the hypercube, 7th Polish Combinatorial Conference, Będlewo, Poland, 2018.

Shotgun assembly of the hypercube, Combinatorics Seminar, University of Birmingham, Birmingham, UK, 2018.

Parking on a random tree, 18th International Conference on Random Structures and Algorithms RS&A2017, Gniezno, Poland, 2017.

On the critical density of a minor-closed class, Combinatorics Seminar, University of Warwick, Coventry, UK, 2017.

Parking on a random tree, Combinatorics Seminar, University of Oxford, Oxford, UK, 2017.

On the purity of minor-closed classes of graphs, 6th Polish Combinatoral Conference, Będlewo, Poland, 2016.

The time of graph bootstrap percolation, DIMAP Seminar, University of Warwick, Coventry, UK, 2016.

On the maximum running time in graph bootstrap percolation, 17th International Conference on Random Structures and Algorithms RS&A2015, Pittsburgh, USA, 2015.

The time of graph bootstrap percolation, 5th Polish Combinatoral Conference, Będlewo, Poland, 2014.

Phase transitions in bootstrap percolation, Combinatorics Seminar, University of Oxford, Oxford, UK, 2014.

Phase transitions in bootstrap percolation, Combinatorics Seminar, University of Birmingham, Birmingham, UK, 2014.

Subcritical update rules in bootstrap percolation, Combinatorics Seminar, University of Memphis, Memphis, USA, 2013.

Bootstrap percolation on Galton–Watson trees, 16th International Conference on Random Structures and Algorithms RS&A2013, Poznań, Poland, 2013.

Maximal percolation time in bootstrap percolation, Combinatorics Seminar, University of Bristol, Bristol, UK, 2013.

Maximal percolation time in bootstrap percolation, 4th Polish Combinatoral Conference, Będlewo, Poland, 2012.

Extremal Problems in Bootstrap Percolation, International Conference on Mathematics and Statistics, University of Memphis, Memphis, USA, 2012.

Bootstrap percolation, Block Course: Extremal Combinatorics in Random Discrete Structures, Freie Universität Berlin, Berlin, Germany, 2012.

Maximal percolation time in bootstrap percolation, Combinatorics Seminar, University of Cambridge, Cambridge, England, UK, 2012.

Bootstrap percolation, Seminar series, Wrocław University of Technology, Wrocław, Poland, 2011.

Maximal percolation time in 2-neighbour bootstrap percolation, Combinatorics Seminar, University of Memphis, Memphis, USA, 2011.

Maximal percolation time in 2-neighbour bootstrap percolation, Atlanta Lecture Series in Combinatorics and Graph Theory IV, Georgia State University, Atlanta, USA, 2011.

Optimal stopping in a search for a vertex with full degree in a random graph, 22nd British Combinatorial Conference, University of St Andrews, St Andrews, Scotland, UK, 2009.

Optimal stopping in a search for a vertex with full degree in a random graph, Department of Discrete Mathematics Seminar, Adam Mickiewicz University, Poznań, Poland, 2008.

Teaching and Supervision Experience

July 2018 – Present: Supervisor for MSci Projects at the University of Birmingham.

2017 – 2018: Departmental Lecturer in Combinatorics at the Mathematical Institute of the University of Oxford. Lectured and examined two 4th year courses: Combinatorics and Probabilistic Combinatorics. Responsible for setting and marking the exam papers, as well as multiple projects throughout the year.

2014 – 2018: Drapers' Junior Research Fellow and Stipendiary Lecturer at St Anne's College, Oxford. Undergraduate tutorials and classes in Analysis, Linear Algebra, Probability, Topology, Graph Theory, and Introduction to University Mathematics. Postgraduate classes in Combinatorics and Probabilistic Combinatorics. Supervision of a visiting student.

2011 – 2014: PhD student at Trinity College, Cambridge. Undergraduate tutorials in Probability and Numbers & Sets.

2007 – 2009: Teaching Assistant at the Wrocław University of Science and Technology. Courses taught: Introduction to Computer Science & Programming, Graph Theory, Discrete Mathematics, Probabilistic Methods in Graph Theory.

Since June 2017: Associate Fellow of the Higher Education Academy (AFHEA).

Administrative duties

October 2016 – June 2018: Member of the Early Career Researchers Committee at the Mathematical Institute, University of Oxford.

October 2015 – March 2018: Organiser of the Subject Family Events seminar series at St Anne's College, University of Oxford.

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