Justin Ward

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Citizenship: United States of America

Current position

2012– Research Fellow, Centre for Discrete Mathematics and its Applications, Department of Computer Science, University of Warwick

Research Interests

Theoretical computer science
Combinatorial optimization
Design and analysis of approximation algorithms
Local search algorithms
Submodular maximization
Matroid theory
Software verification
Functional programming and language design

Education

2012 Ph.D. Computer Science, University of Toronto
SPECIALIZATION: Theory of Computing
THESIS: Oblivious and Non-Oblivious Local Search for Combinatorial Optimization
SUPERVISOR: Allan Borodin

2007 M.Sc. Computer Science, University of Toronto
SPECIALIZATION: Software Engineering
THESIS: A Unified Model of Algorithm Design

2005 B.Sc. Computer Science, with Distinction, University of Kansas
B.A. English, with Distinction, University of Kansas

Publications & Talks

Submitted and Working Papers

2014 Maxim Sviridenko, Jan Vondrák, Justin Ward. "Optimal approximation for submodular and supermodular optimization with bounded curvature." Submitted to Mathematics of Operations Research.
Preprint: http://arxiv.org/abs/1311.4728.

Marek Adamczyk, Maxim Sviridenko, and Justin Ward. "Submodular Stochastic Probing on Matroids." Submitted to Mathematics of Operations Research.
Preprint: http://arxiv.org/abs/1310.4415

Justin Ward and Stanislav Živný. "Maximizing k-Submodular Functions and Beyond." Submitted to ACM Transactions on Algorithms.
Preprint: http://arxiv.org/abs/1409.1399

Journal Articles

2014 Yuval Filmus and Justin Ward. "A tight combinatorial algorithm for submodular maximization subject to a matroid constraint." SIAM Journal on Computing 43-2 (2014), pp. 514-542.

Peer-Reviewed Conference Proceedings

2015 Maxim Sviridenko, Jan Vondrák, Justin Ward. "Optimal approximation for submodular and supermodular optimization with bounded curvature." In *SODA '15: Proceedings of the 25th ACM-SIAM Symposium on Discrete Algorithms*, 2015.

2014 Marek Adamczyk, Maxim Sviridenko, Justin Ward. "Submodular Stochastic Probing on Matroids." In *STACS '14: 29th International Symposium on Theoretical Aspects of Computer Science*. pp. 29-40, 2014.

Justin Ward and Stanislav Živný. "Maximizing Bisubmodular and k-Submodular Functions." In *SODA '14: Proceedings of the 24th ACM-SIAM Symposium on Discrete Algorithms*, pp. 1468-1481, 2014.

2013 Maxim Sviridenko and Justin Ward. "Large Neighborhood Local Search for the Maximum Set Packing Problem." In *ICALP '13: 40th International Colloquium on Automata Languages and Programming*, pp. 792-803, 2013.

2012 Yuval Filmus and Justin Ward. "A tight combinatorial algorithm for submodular maximization subject to a matroid constraint." In *FOCS '12: Proceedings of the 53rd IEEE Symposium on Foundations of Computer Science*, pp. 659-668, 2012.

Yuval Filmus and Justin Ward. "The Power of Local Search: Maximum Coverage over a Matroid." In *STACS '12: 29th International Symposium on Theoretical Aspects of Computer Science*, pp. 601-612, 2012.

2012 Justin Ward. "A $(k+3)/2$-Approximation Algorithm for Monotone Submodular k-set Packing and General k-Exchange Systems." In *STACS '12: 29th International Symposium on Theoretical Aspects of Computer Science*, pp. 42-53, 2012.

2011 Moran Feldman, Joseph (Seffi) Naor, Roy Schwartz, and Justin Ward. "Improved Approximations for k-Exchange Systems." In *ESA '11: Proceedings of the 19th European Symposium on Algorithms*, pp. 784-798, 2011.

2005 Justin Ward, Garrin Kimmell, and Perry Alexander. "Prufrock: A Framework for Constructing Polytypic Theorem Provers." In *ASE '05: Proceedings of the 20th IEEE/ACM International Conference on Automated Software Engineering*, pp. 423-426, 2005.

Invited Talks

2014 "Approximating k-Set Packing with Local Search on Large Neighborhoods." Workshop on Frontiers and Connections between Parametrization and Approximation. Bertinoro, Italy. 29 May 2014.

"Iterative Rounding Algorithms for Stochastic Probing Problems." University of Edinburgh LFCS Seminar. 13 May 2014.

"Large Neighborhood Local Search for k-Set Packing Problems." University of Liverpool Computer Science Departmental Seminar Series. 4 February 2014.

2013 "Maximizing Bisubmodular and k-Submodular Functions." Oxford University Algorithms Seminar. 12 November 2013.

"Maximizing Bisubmodular and k-Submodular Functions." Durham University Algorithms and Complexity Seminar. 30 October 2013.

"Local Search Algorithms for Set Packing Problems." University of Leicester Computer Science Seminar. 11 October 2013.

"Maximizing Bisubmodular and k-Submodular Functions." 4th Cargèse Workshop on Combinatorial Optimization. 1 October 2013.

"From Submodular to k-Submodular Maximization." 6th Workshop on Flexible Network Design. Fields Institute, Toronto, Canada. 31 July 2013.

"Local Search Algorithms for k-Set Packing Problems." Invited talk at Google Research Manhattan. 26 July 2013.

"Local Search Algorithms for k-Set Packing Problems." University of Warwick DIMAP Retreat. 25 March 2013.

"Non-oblivious local search and submodular maximization." Invited Speaker at QMUL and Warwick DIMAP PhD Workshop. 6 March 2013.

2012 "Improved Approximations for Monotone Submodular k-Set Packing and General k-Exchange Systems." DIMAP Seminar at University of Warwick. 6 March 2012.

"Improved Approximations for Monotone Submodular k-Set Packing and General k-Exchange Systems." Invited Seminar at Laboratoire d'Informatique Algorithmique. 27 February 2012.

2011 "Linear and Monotone Submodular Optimization in k-Exchange Systems." 4th Eastern Great Lakes Theory of Computation Workshop. 10 September 2011.

Grants, Honors & Awards

2011 Doctoral Completion Award, University of Toronto
($10,000 plus tuition for final year of doctoral study)

2007-2011 University of Toronto Fellowship (Ph.D.)

2005-2007 University of Toronto Fellowship (M.Sc.)

2005 Ilus W. Davis Writing Award, Department of English, University of Kansas

Teaching Experience

Courses Taught

2013-2014 Dept. of Computer Science, University of Warwick
Algorithmic Graph Theory, Spring 2013 (1/3 of course) and Spring 2014.

2009 Dept. of Computer Science, University of Toronto
Principles of Programming Languages, Summer 2009.

Teaching Assistantships

2005-2012 Dept. of Computer Science, University of Toronto
Introduction to Programming (Fall 2005).
Mathematical Expression and Reasoning for Computer Science (Winter 2006).
The Why and How of Computing (Fall 2007).
Principles of Programming Languages (Fall 2006, Winter 2007, Fall 2007, Winter 2008, Summer 2008, Fall 2008, Winter 2009, Winter 2010).
Introduction to the Theory of Computation (Fall 2010).
Algorithm Design and Analysis (Summer 2010, Winter 2011).
Algorithm Design, Analysis and Theory (Spring 2012).

Academic Service

2013- Departmental Postdoc Representative, Computer Science Department, University of Warwick

References

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