

Tyson Williams

Curriculum Vitae

University of Wisconsin–Madison Department of Computer Sciences
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Education

- Ph.D. candidate University of Wisconsin–Madison (UW–M)
Advisor: Jin-Yi Cai
Expected graduation: May, 2015
- M.S. University of Wisconsin–Madison, 2012
- B.S. Computer Science, Iowa State University (ISU), 2009
- B.S. Computer Engineering, Iowa State University, 2009

Publications

Conference Proceedings

1. Jin-Yi Cai, Heng Guo, and Tyson Williams. The complexity of counting edge colorings and a dichotomy for some higher domain Holant problems (extended abstract). In *Proceedings of the 55th Annual Symposium on Foundations of Computer Science (FOCS)*. IEEE, 2014. To appear.
2. Jin-Yi Cai, Heng Guo, and Tyson Williams. Holographic algorithms beyond matchgates. In *Proceedings of the 41st International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 271–282. Springer Berlin Heidelberg, 2014.
3. Heng Guo and Tyson Williams. The complexity of planar Boolean #CSP with complex weights. In *Proceedings of the 40th International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 516–527. Springer Berlin Heidelberg, 2013.
4. Jin-Yi Cai, Heng Guo, and Tyson Williams. A complete dichotomy rises from the capture of vanishing signatures (extended abstract). In *Proceedings of the 45th annual ACM Symposium on Theory of Computing (STOC)*, pages 635–644. ACM, 2013.
5. Jin-Yi Cai, Michael Kowalczyk, and Tyson Williams. Gadgets and anti-gadgets leading to a complexity dichotomy. In *Proceedings of the 3rd Innovations in Theoretical Computer Science Conference (ITCS)*, pages 452–467. ACM, 2012.

Invited Book Chapters

1. Jin-Yi Cai and Tyson Williams. Holant: Partition function of the edge coloring model. In Joanna Ellis-Monaghan and Iain Moffatt, editors, *CRC Handbook on the Tutte Polynomial and Related Topics*. CRC Press. In preparation.
2. Jin-Yi Cai, Heng Guo, and Tyson Williams. Holant problems. In Ming-Yang Kao, editor, *Encyclopedia of Algorithms*. Springer. In preparation.

Fellowships

University of Wisconsin–Madison

- 2014 Cisco Systems Distinguished Graduate Fellowship (awarded again)
- 2013 Cisco Systems Distinguished Graduate Fellowship
- 2010 Summer Department Fellowship

Academic Talks

- 2014 *The Complexity of Counting Edge Colorings and a Dichotomy for Some Higher Domain Holant Problems*, 55th IEEE Symposium on Foundations of Computer Science, Philadelphia, PA, October 19.
- The Complexity of Counting Edge Colorings and a Dichotomy for Some Higher Domain Holant Problems*, SIAM Conference on Discrete Mathematics: Minisymposia on Graph Polynomials, Minneapolis, MN, June 19.
- Siegel’s Theorem, Edge Coloring, and a Holant Dichotomy*, Applied Algebra Days 2, Madison, WI, May 11.
- Siegel’s Theorem, Edge Coloring, and a Holant Dichotomy*, Applied Algebra Seminar, Mathematics Department, Madison, WI, May 2.
- 2013 *The Complexity of Counting Problems*, Google Madison, Madison, WI, May 17.
- The Complexity of Planar Boolean #CSP with Complex Weights*, Dagstuhl Seminar on Computational Counting, Schloss Dagstuhl – Leibniz Center for Informatics, Wadern, Germany, January 15.
- Tutorial on Holant Problems*, Dagstuhl Seminar on Computational Counting, Schloss Dagstuhl – Leibniz Center for Informatics, Wadern Germany, January 14.
- 2012 *Gadgets and Anti-Gadgets Leading to a Complexity Dichotomy*, 3rd Innovations in Theoretical Computer Science (ITCS) conference, Cambridge, MA, January 10.

2011 *Gadgets and Anti-Gadgets Leading to a Complexity Dichotomy*, 62nd Midwest Theory Day, Northwestern University, November 13.

Teaching Experience

Guest Lecturer

2014 Fall	Introduction to Theory of Computing	UW–M
	Advanced Algorithms and Data Structures	UW–M
2011 Spring	Quantitative Reasoning and Problem Solving	UW–M

Teaching Assistant

2013 Spring	Introduction to Discrete Mathematics	UW–M
2011 Spring	Computational Complexity	UW–M
2009–2012	Quantitative Reasoning and Problem Solving	UW–M
2009 Spring	Theory of Computing	ISU
2008 Spring	Design and Analysis of Algorithms	ISU
2007 Spring	Introduction to Object Orientated Programming	ISU

Tutor

2013 Spring	Introduction to Programming	UW–M
2006 Fall	Introduction to Object Orientated Programming	ISU

Service

Journal Referee

Computational Complexity, Information Processing Letters, Journal of Symbolic Computation, SIAM Journal on Computing

University of Wisconsin–Madison

2012–Present	Maintain theory group website
2011–2014	Arranged for prospective graduate students to meet the theory group
2010–2012	Coordinated weekly theory group lunch
2010–2012	Told new graduate students about alternative graduate funding sources

Wikipedia

I have significantly contributed to various Wikipedia articles, including *Absorbing Markov chain*, *BHT algorithm*, *FKT algorithm*, *Holographic algorithm*, and *Medial graph*. I have also created dozens of images for Wikipedia, several of which appear in foreign language articles.