Daniel Štefankovič - C.V.

July 29th, 2015

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Education and employment history

The University of Rochester, Rochester, NY, U.S.A.

Assistant professor in the Department of Computer Science. Summer 2005 – Summer 2012
Associate professor in the Department of Computer Science. Summer 2012 –

The University of Chicago, Chicago, IL, U.S.A. Autumn 1998 – Summer 2005

Ph.D. in Computer Science, awarded 06/2005,
advisor: László Babai, thesis: *Algorithms for curves on surfaces.*

Master's degree in Computer Science, awarded 12/2000,
advisor: László Babai, thesis: *Fourier transforms in computer science.*

Comenius University, Bratislava, Slovakia Autumn 1993 – Summer 1998

Magister degree in Computer Science, awarded 06/1998,
advisor: Peter Ružička, thesis: *Multidimensional Interval Routing Schemes.*

Journal publications

J30. Ricardo Restrepo, Daniel Štefankovič, Juan Carlos Vera, Eric Vigoda, Linji Yang. *Phase Transition for Glauber Dynamics for Independent Sets on Regular Trees.* SIAM Journal on Discrete Mathematics (SIDMA) 28(2): 835–861, 2014. (Conference version: C25.)

J29. Andreas Galanis, Qi Ge, Daniel Stefankovic, Eric Vigoda, Linji Yang. *Improved inapproximability results for counting independent sets in the hard-core model.* Random Structures and Algorithms (RSA) 45(1): 78–110, 2014. (Conference version: C26.)

J28. Radoslav Fulek, Michael J. Pelsmajer, Marcus Schaefer, Daniel Štefankovič: *Adjacent Crossings Do Matter.* Journal of Graph Algorithms and Applications (JGAA) 16(3): 759–782, 2012. (Conference version: C29.)

J27. Daniel Štefankovič, Santosh Vempala, Eric Vigoda: *A Deterministic Polynomial-Time Approximation Scheme for Counting Knapsack Solutions.* SIAM Journal on Computing (SICOMP) 41(2): 356–366, 2012. (Conference version: C28.)

J26. Qi Ge, Daniel Štefankovič: *A Graph Polynomial for Independent Sets of Bipartite Graphs.* Combinatorics, Probability & Computing (CPC) 21(5): 695–714, 2012. (Conference version: C24.)

J25. Qi Ge and Daniel Štefankovič. *The complexity of counting eulerian tours in 4-regular graphs.* Algorithmica, 63(3): 588–601, 2012. (Conference version: C23.)

J24. Daniel Štefankovič, Eric Vigoda. *Fast convergence of MCMC algorithms for phylogenetic reconstruction with homogeneous data on closely related species.* SIAM Journal on Discrete Mathematics (SIDMA) 25(3): 1194-1211, 2011. (No conference version.)

J23. Ivona Bezáková, Alistair Sinclair, Daniel Štefankovič, and Eric Vigoda. *Negative examples for sequential importance sampling of binary contingency tables.* Algorithmica 64(4): 606–620, 2012. (Conference version: C12.)

J22. Michael J. Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Crossing numbers of graphs with rotation systems.* Algorithmica 60(3): 679–702, 2011. (Conference version: C16.)

J21. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Spiraling and folding: the word view.* Algorithmica 60(3): 609–626, 2011. (Conference version: C13.)

J20. Michael Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Removing independently even crossings.* SIAM Journal on Discrete Mathematics (SIDMA) 24(2):379–393, 2010. (Conference version: C22.)

J19. Daniel Štefankovič, Santosh Vempala, Eric Vigoda. *Adaptive simulated annealing: A near-optimal connection between sampling and counting.* Journal of the Association for Computing Machinery (JACM) 56(3), 2009, (DOI 10.1145/1516512.1516520). (Conference version: C18.)

J18. Michael Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Removing even crossings on surfaces.* European Journal of Combinatorics (EJC), 30:1704-1717, 2009. (Conference version: C14.)

J17. Ivona Bezáková, Daniel Štefankovič, Vijay Vazirani, Eric Vigoda. *Accelerating simulated annealing for the permanent and combinatorial counting problems.* SIAM Journal on Computing (SICOMP) 37(5):1429-1454, 2008. (Conference version: C11.)

J16. Michael Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Odd crossing number and crossing number are not the same.* Discrete and Computational Geometry (DCG) 39(1-3):442–454, 2008. (Conference version: C10.)

J15. Michael Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Removing even crossings.* Journal of Combinatorial Theory B (JCTB) 97(4):489–500, 2007. (Conference version: C9.)

J14. Manu Chhabra, Robert Jacobs, Daniel Štefankovič. *Behavioral shaping for geometric concepts.* Journal of Machine Learning Research (JMLR) 8:1835–1865, 2007.

J13. Peter Hui, Michael J. Pelsmajer, Marcus Schaefer, Daniel Štefankovič. *Train tracks and confluent drawings.* Algorithmica 47(4):465-479, 2007. (Conference version: C8.)

J12. Daniel Štefankovič, Eric Vigoda. *Phylogeny of mixture models: robustness of maximum likelihood and non-identifiable distributions.* Journal of Computational Biology 14(2):156–189, 2007. (No conference version.)

J11. Daniel Štefankovič, Eric Vigoda. *Pitfalls of heterogeneous processes for phylogenetic reconstruction.* Systematic Biology 56(1):113–124, 2007. (No conference version.)

J10. Bruno Codenotti, Daniel Štefankovič. *On the computational complexity of Nash equilibria for (0,1)-bimatrix games.* Information Processing Letters (IPL) 94(3):145–150, 2005. (No conference version.)

J9. Marcus Schaefer, Daniel Štefankovič. *Solvability of graph inequalities.* SIAM Journal on Discrete Mathematics (SIDMA) 19:728–743, 2005. (No conference version.)

J8. László Babai, Amir Shpilka, Daniel Štefankovič. *Locally testable cyclic codes.* IEEE Transactions on Information Theory 51(8):2849–2858, 2005. (Conference version: C6.)

J7. Marcus Schaefer, Daniel Štefankovič. *Decidability of string graphs.* Journal of Computer and System Sciences (JCSS) 68(2):319–334, 2004. (Conference version: C3.)

J6. Marcus Schaefer, Eric Sedgwick, Daniel Štefankovič. *Recognizing string graphs in NP.* Journal of Computer and System Sciences (JCSS) 67(2):365–380, 2003. (Conference version: C5.)

J5. Rastislav Kráľovič, Branislav Rovan, Peter Ružička, Daniel Štefankovič. *Efficient deadlock-free multidimensional interval routing in hypercube-like networks.* Computing and Informatics 21(3):265–287, 2002.

J4. László Babai, Péter Frankl, Samuel Kutin, Daniel Štefankovič. *Set systems with restricted intersections modulo prime powers.* Journal of Combinatorial Theory A (JCTA) 95(1):39–73, 2001. (No conference version.)

J3. Daniel Štefankovič. *Acyclic orientations do not lead to optimal deadlock free packet routing algorithms.* Information Processing Letters (IPL) 73(5-6):221–225, 2000. (No conference version.)

J2. Peter Ružička, Daniel Štefankovič. *On the complexity of multidimensional routing schemes.* Theoretical Computer Science (TCS) 254(2):255–280, 2000. (No conference version.)

J1. Rastislav Kráľovič, Peter Ružička, Daniel Štefankovič. *The complexity of shortest path and dilation bounded interval routing.* Theoretical Computer Science (TCS) 234(1-2):85–107, 2000. (Conference version: C1.)

Publications in selective conferences

C35. Andreas Galanis, Daniel Štefankovič, Eric Vigoda. *Swendsen-Wang Algorithm on the Mean-Field Potts Model.* 19th International Workshop on Randomization and Computation (RANDOM 2015), pp. 815–828, 2015.

C34. Alistair Sinclair, Piyush Srivastava, Daniel Štefankovič, Yitong Yin. *Spatial mixing and the connective constant: Optimal bounds.* 26th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2015), pp. 1549–1563, 2015.

C33. Jin-Yi Cai, Andreas Galanis, Leslie Goldberg, Heng Guo, Mark Jerrum, Daniel Štefankovič, Eric Vigoda. *#BIS-Hardness for 2-Spin Systems on Bipartite Bounded Degree Graphs in the Tree Non-uniqueness Region.* 18th International Workshop on Randomization and Computation (RANDOM 2014), pp. 582–595, 2014.

C32. Andreas Galanis, Daniel Štefankovič, Eric Vigoda, Linji Yang. *Ferromagnetic Potts Model: Refined #BIS-hardness and Related Results.* 18th International Workshop on Randomization and Computation (RANDOM 2014), pp. 677–691, 2014.

C31. Andreas Galanis, Daniel Štefankovič, Eric Vigoda. *Inapproximability for antiferromagnetic spin systems in the tree non-uniqueness region.* 46th Annual ACM Symposium on Theory of Computing (STOC 2014), pp. 823–831, 2014.

C30. Marcus Schaefer and Daniel Štefankovič. *Block Additivity of Z2-Embeddings.* 21st International Symposium on Graph Drawing (GD 2013), pp. 185–195, 2013.

C29. Radoslav Fulek, Michael J. Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Adjacent crossings do matter.* 19th International Symposium on Graph Drawing (GD 2011), Lecture Notes in Computer Science 7034, pp. 343–354, 2011. (Journal version: J28.)

C28. Parikshit Gopalan, Adam Klivans, Raghu Meka, Daniel Štefankovič, Santosh Vempala, and Eric Vigoda. *An FPTAS for #Knapsack and related counting problems.* 52nd Annual IEEE Symposium on Foundations of Computer Science (FOCS 2011), pp. 817–826, 2011. (Journal version: J27.)

C27. Radoslav Fulek, Michael J. Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Hanani-Tutte and monotone drawings.* 37th International Workshop on Graph-Theoretic Concepts in Computer Science (WG 2011), pp. 283–294, 2011.

C26. Andreas Galanis, Qi Ge, Daniel Štefankovič, Eric Vigoda, and Linji Yang. *Improved inapproximability results for counting independent sets in the hard-core model.* 15th International Workshop on Randomization and Computation (RANDOM 2011), pp. 567–578, 2011. (Journal version: J29.)

C25. Ricardo Restrepo, Daniel Štefankovič, Juan Carlos Vera, Eric Vigoda, and Linji Yang. *Phase transition for Glauber dynamics for independent sets on regular trees.* 22nd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2011), pp. 945–956, 2011. (Journal version: J30.)

C24. Qi Ge and Daniel Štefankovič. *A graph polynomial for independent sets of bipartite graphs.* 30th International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2010), pp. 240–250, 2010. (Journal version: J26.)

C23. Qi Ge and Daniel Štefankovič. *The complexity of counting eulerian tours in 4-regular graphs.* 9th Latin American Theoretical Informatics Symposium (LATIN 2010), pp. 638–649, 2010. (Journal version: J25.)

C22. Michael J. Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Removing independently even crossings.* 17th International Symposium on Graph Drawing (GD 2009), Lecture Notes in Computer Science Volume 5849, pp. 201–206, 2009. (Journal version: J20.)

C21. Satyaki Mahalanabis and Daniel Štefankovič. *Approximating L1-distances between mixture distributions using random projections.* 6th Workshop on Analytic Algorithmics and Combinatorics (ANALCO 2009), pp. 75–84, 2009.

C20. Satyaki Mahalanabis and Daniel Štefankovič. *Density estimation in linear time.* 21st Annual Conference on Learning Theory (COLT 2008), pp. 503–512, 2008.

C19. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Computing Dehn twists and geometric intersection numbers in polynomial time.* 20th Canadian Conference in Computational Geometry (CCCG 2008), pp. 111–114, 2008.

C18. Daniel Štefankovič, Santosh Vempala, and Eric Vigoda. *Adaptive simulated annealing: a near-optimal connection between sampling and counting.* 48th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2007), pp. 183–193, 2007. (Journal version: J19.)

C17. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Spiralling and folding: the topological view.* 19th Canadian Conference on Computational Geometry (CCCG 2007), pp. 73–76, 2007.

C16. Michael J. Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Crossing number of graphs with rotation systems.* 15th International Symposium on Graph Drawing (GD 2007), Lecture Notes in Computer Science 4875, pp. 3–12, 2007. (Journal version: J22.)

C15. Michael Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Crossing numbers and parameterized complexity.* 15th International Symposium on Graph Drawing (GD 2007), Lecture Notes in Computer Science 4875, pp. 31–36, 2007.

C14. Michael Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Removing even crossings on surfaces.* European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB 2007), Electronic Notes in Discrete Mathematics 29:85–90, 2007. (Journal version: J18.)

C13. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Folding and spiralling: the word view.* European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB 2007), Electronic Notes in Discrete Mathematics 29:101–105, 2007. (Journal version: J21.)

C12. Ivona Bezáková, Alistair Sinclair, Daniel Štefankovič, and Eric Vigoda. *Negative examples for sequential importance sampling of binary contingency tables.* 14th Annual European Symposium on Algorithms (ESA 2006), pp. 136–147, 2006. (Journal version: J23.)

C11. Ivona Bezáková, Daniel Štefankovič, Vijay Vazirani, and Eric Vigoda. *Approximating the permanent in $O^*(n^7)$ time.* 17th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2006), pp. 900–907, 2006. (Journal version: J17.)

C10. Michael Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Odd crossing number is not crossing number.* 13th International Symposium on Graph Drawing (GD 2005), Lecture Notes in Computer Science 3843, pp. 386–396, 2005. (Journal version: J16.)

C9. Michael Pelsmajer, Marcus Schaefer, and Daniel Štefankovič. *Removing even crossings.* European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB 2005), Discrete Mathematics and Theoretical Computer Science Proceedings, pp. 105–110, 2005. (Journal version: J15.)

C8. Peter Hui, Marcus Schaefer, and Daniel Štefankovič. *Train tracks and confluent drawings.* 12th International Symposium on Graph Drawing (GD 2004), Lecture Notes in Computer Science 3383, pp. 318–328, 2004. (Journal version: J13.)

C7. László Babai and Daniel Štefankovič. *Simultaneous Diophantine approximation with excluded primes.* 15th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2004), pp. 1123–1129, 2004.

C6. László Babai, Amir Shpilka, and Daniel Štefankovič. *Locally testable cyclic codes.* 44th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2003), pp. 116–125, 2003. (Journal version: J8.)

C5. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Recognizing string graphs in NP.* 34th Annual ACM Symposium on Theory of Computing (STOC 2002), pp. 1–6, 2002. (Journal version: J6.)

C4. Marcus Schaefer, Eric Sedgwick, and Daniel Štefankovič. *Algorithms for normal curves and surfaces.* Computing and Combinatorics: 8th Annual International Conference (COCOON 2002), pp. 370–380, 2002.

C3. Marcus Schaefer and Daniel Štefankovič. *Decidability of string graphs.* 33rd Annual ACM Symposium on Theory of Computing (STOC 2001), pp. 241–246, 2001. (Journal version: J7.)

C2. Rastislav Královič, Branislav Rovan, Peter Ružicka, and Daniel Štefankovič. *Efficient deadlock-free multi-dimensional interval routing in interconnection networks.* Distributed Computing, 12th International Symposium (DISC 1998), Lecture Notes in Computer Science 1499, pp. 273–287, 1998.

C1. Rastislav Kráľovič, Peter Ružička, and Daniel Štefankovič. *The complexity of shortest path and dilation bounded interval routing.* 3rd International Euro-Par Conference on Parallel Processing (EURO-PAR 1997), Lecture Notes in Computer Science 1300, pp. 258–265, 1997. (Journal version: J1.)

Journal/conference publications outside theory

O3. Tagyoung Chung, Licheng Fang, Daniel Gildea, Daniel Štefankovič: Sampling Tree Fragments from Forests. Computational Linguistics 40(1): 203–229, 2014.

O2. Tivadar Papai, Henry A. Kautz, and Daniel Štefankovič. *Slice Normalized Dynamic Markov Logic Networks.* 26th Annual Conference on Neural Information Processing Systems 2012 (NIPS 2012), pp. 1916–1924, 2012.

O1. Daniel Gildea and Daniel Štefankovič. *Worst-case synchronous grammar rules.* Human Language Technologies 2007: The Conference of the North American Chapter of the Association for Computational Linguistics (NAACL-HLT 2007); Proceedings of the Main Conference, pp. 147–154, 2007.

Ph.D. students

S2. Satyaki Mahalanabis (graduated 2012), thesis topic: "Subset and Sample Selection for Graphical Models: Gaussian Processes, Ising Models and Gaussian Mixture Models."

S1. Qi Ge (graduated 2011), thesis topic: "Exact and Approximate Counting of Graph Objects: Independent Sets, Eulerian Tours, and More."

Talks

Spin models: belief propagation, behavior on random regular graphs, and matrix norms.
The New York Colloquium on Algorithms and Complexity, November 2014 (invited).
Oxford, UK, May 2014 (invited).
Berkeley Probability Seminar, October 2013 (invited).
Random Structures and Algorithms, August 2013.
Seventh Czech-Slovak International Symposium on Graph Theory, Combinatorics, Algorithms and Applications. July 2013 (invited).

Inapproximability of the Partition Function for the Antiferromagnetic Ising and Hard-Core Models.
AMS Fall Eastern Sectional Meeting; Special Session on Probability and Statistical Physics, September 2012 (invited).
Dagstuhl seminar 13031 (Combinatorial Counting), January 2013 (invited).

A Deterministic Polynomial-time Approximation Scheme for Counting Knapsack Solutions.
Georgia Tech, ARC Colloquium, February 2011 (invited).

Graph polynomial for independent sets in bipartite graphs.
Bernoulli Conference on Discrete and Computational Geometry, August 2010 (invited).

Variants of crossing numbers (survey).
Workshop on Theory and Algorithmic Aspects of Graph Crossing Number (TAAGCN, MFCS 2010 satellite), August 2010 (invited).

The complexity of counting eulerian tours in 4-regular graphs.
Latin American Theoretical Informatics Symposium, April 2010.

Counting and sampling using Markov chains (general audience talk).
RIT colloquium, October 2009 (invited).

Removing independently even crossings.
Graph drawing, September 2009.

Algorithmic problems for curves and surfaces.
Algorithmic and Combinatorial Geometry, July 2009 (invited).

Density estimation in linear time.
The Eastern Great Lakes Theory Workshop, September 2008 (invited).
Georgia Tech - Machine Learning Seminar, March 2008 (invited).

Adaptive annealing: a near-optimal connection between sampling and counting.
Tokyo Institute of Technology - MCMC Fall School, September 2008 (invited).
FOCS, November 2007.
DIMACS, Georgia Tech, March 2007 (invited).
NYU/CUNY, March 2007 (invited).
University of Toronto, Theory Seminar, December 2006 (invited).
University of Chicago, Theory Seminar, December 2006 (invited).
University of Rochester, Colloquium, December 2006.

Odd crossing number is not crossing number.
RIT, Math Department Colloquium, October 2005 (invited).
Graph Drawing, September 2005.
Discrete and Computational Geometry–Twenty Years Later, June 2006 (invited).

Phylogeny of mixture models: maximum likelihood, ambiguity, and linear tests.
IIT, December 2005 (invited).

Simultaneous diophantine approximation with excluded primes.
SODA, January 2004.
MIT, Theory of Computation Seminar, November 2003 (invited).

Locally testable cyclic codes.
DePaul, Theory Seminar, September 2003 (invited).
FOCS, October 2003.

Recognizing string graphs in NP.
DIMACS Workshop on Geometric Graph Theory, October 2002 (invited).
STOC, May 2002.
University of Wisconsin - Madison, Theory Seminar, February 2002 (invited).
Midwest Theory Day, December 2001.
DePaul, Theory Seminar, November 2001 (invited).

Decidability of string graphs.
STOC, July 2001.
DePaul, Theory Seminar, February 2001 (invited).

Midwest Theory Day, December 2000.

The complexity of shortest path and dilation bounded interval routing.
Europar, August 1997.

Grants

G2. AF: Small: Identifying sampling problems with efficient algorithms, NSF CCF-1318374, PI, 3 years (2013–2016), $399,000.

G1. RI: Large: Collaborative Research: Random Processes and Randomized Algorithms, NSF CCF-0910415, PI, 3 years (2009–2012), $300,000.

Service

- Department committees: graduate admissions (05/06, 06/07, 07/08, 09/10, 10/11), web (07/08), faculty recruiting (07/08).
- University committees: faculty council (06/07, 08/09), university council on graduate studies (08/09).
- Program committee member:
  24th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2013),
  38th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2012),
  21st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2010),
  35th International Symposium on Mathematical Foundations of Computer Science (MFCS 2010),
  Computing and Combinatorics: 16th Annual International Conference (COCOON 2010),
  Computing and Combinatorics: 15th Annual International Conference (COCOON 2009).
- Referee for the following journals: Computational Complexity, Theory of Computing Systems, Discrete&Computational Geometry, Journal of Graph Theory, Journal of Combinatorial Theory (Series B), SIAM Journal on Computing.
- Referee for the following conferences: STOC'11, SoCG'10, NIPS'09, NIPS'08, MFCS'08, STOC'08, ESA'07, ICALP'07, STACS'07, HiPC'06, STOC'05, WG'04, CCC'03, WG'03, CCC'02, MFCS'01, WG'99.
- Panel member (NSF CCF'2011).
- Technical support for STOC'04 PC.

Teaching Experience

Mathematical foundations of artificial intelligence (CSC 246/446) Spring 2009-2010
Graduate AI course, University of Rochester.

Advanced algorithms (CSC 284/484) Spring 2007-2008, Spring 2011-2013
Graduate algorithms course, University of Rochester.

Markov chains (CSC 574) Spring 2006
Graduate seminar course on (theoretical) Markov chain Monte Carlo, University of Rochester.

Algorithms (CSC 282) Fall 2006-2012
Undergraduate algorithms course, University of Rochester.

TA for *Research experiences for undergraduates* Summer 2003, Summer 2004
REU courses Discrete Mathematics and Linear Algebra, University of Chicago.

Introduction to WWW-2 (CS102) Summer 2001
Introductory JAVA course, University of Chicago.

TA for *Algorithms (CS270)* Winter 2000, Winter 2001
Graduate/undergraduate algorithms course, University of Chicago.

TA for *Discrete mathematics (CS174)* Autumn 1998, Autumn 1999
Undergraduate discrete mathematics course, University of Chicago.