

DERRICK STOLEE

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Education

Ph.D. Mathematics & Computer Science, University of Nebraska–Lincoln (Expected May 2012)

Advised by Stephen G. Hartke and N. V. Vinodchandran

Dissertation: Combinatorics Using Computational Methods

M.S. Mathematics, University of Nebraska–Lincoln, December 2008

B.S. Mathematics & Computer Science, University of Nebraska–Lincoln, May 2007

Jeffrey S. Raikes School of Computer Science and Management; graduated with Honors

Research Interests

I am interested in many combinatorial problems, especially structural and extremal problems in graph theory. My specialty is developing and applying computational methods to solve problems in pure discrete mathematics. I also have interests in algorithms and computational complexity theory.

Honors and Awards

Presidential Fellowship, University of Nebraska, 2011.

University dissertation fellowship. Four awards per year.

Grace Chisholm Young and William Henry Young Award, UNL Mathematics Department, 2010.

Department award for excellence in research by a graduate student. Awarded once per year.

Outstanding Qualifying Exam, UNL Mathematics Department, 2008.

Othmer Fellowship, University of Nebraska–Lincoln, 2007.

University fellowship for recruiting exceptional scholars seeking terminal degrees.

Published Papers

D. Stolee, N. V. Vinodchandran, Space-efficient algorithms for reachability in surface-embedded graphs. to appear in *Conference on Computational Complexity*, 2012. Available as ECCC TR10-154.

P. Anand, H. Escudro, R. Gera, S. G. Hartke, D. Stolee, On the hardness of recognizing triangular line graphs, to appear in *Discrete Mathematics*, special issue on the 8th French Combinatorics Conference. Available as arXiv:1007.1178v1.

B. Garvin, D. Stolee, R. Tewari, N. V. Vinodchandran, ReachFewL = ReachUL, to appear in *Computational Complexity*, conference version in *COCOON 2011*.

S. G. Hartke, H. Kolb, J. Nishikawa, D. Stolee, Automorphism groups of a graph and a vertex-deleted subgraph. *Electronic Journal of Combinatorics* 17(1), R134, 2010.

D. Stolee, C. Bourke, N. V. Vinodchandran, A log-space algorithm for reachability in acyclic planar digraphs with few sources, *Conference on Computational Complexity*, 2010.

Submitted Papers

D. Stolee, Automorphism Groups and Adversarial Vertex Deletions.1 Available as arXiv:1201.4367.

M. Ferrara, E. Gethner, S. G. Hartke, D. Stolee, P. S. Wenger, List Distinguishing Parameters of Trees. Available as arXiv:1111.4989.

D. Stolee, Generating p -extremal graphs. Available as arXiv:1105.1764.

S. G. Hartke, D. Stolee, D. B. West, M. Yancey, On extremal graphs with a given number of perfect matchings.

This PDF is link-enabled. Papers and slides also available on my web page.

Technical Reports

D. Stolee, Isomorph-free generation of 2-connected graphs with applications. *UNL-CSE Technical Report #120*, also available as arXiv:1104.5261 August 2011.

Teaching Experience

- CSCE 424/824: COMPLEXITY THEORY Spring 2012
 Instructor
 Sole instructor for a senior undergraduate and first-year graduate course.
- MATH 103: TRIGONOMETRY Summer 2011
 Instructor
 Sole instructor for a 5-week summer course for students entering calculus in the fall semester.
- CSCE 424/824: COMPLEXITY THEORY Spring 2010
 Co-instructor *with N. V. Vinodchandran*
 Alternated lectures by topic in a senior undergraduate and first-year graduate course.
- CSCE 361: SOFTWARE ENGINEERING Spring 2010
 Project Support/Grading *with Sebastian Elbaum*
 Developed the semester project for a junior-level undergraduate course where students refactored and extended an open-source application.
- RESEARCH EXPERIENCE FOR UNDERGRADUATES Summer 2009
 Graduate Mentor *with Stephen G. Hartke*
 Investigated several variants of the Reconstruction Conjecture and automorphisms of graphs. See “Automorphism groups of a graph and a vertex-deleted subgraph.”
- MATH 107: CALCULUS II Fall 2007–Fall 2008
 Recitation Lecturer *with S. Cohn, M. Foss, I. Loladze, M. Rammaha, and R. Wiegand*
 Led six sections over three semesters of recitations to provide direct support to students.
- CSCE 235: INTRODUCTION TO DISCRETE STRUCTURES Spring 2007
 Recitation Lecturer *with Brian Kell*
 Provided support to students in a discrete mathematics course for computer science majors.
- RAIK 183H/184H: FOUNDATIONS OF COMPUTER SCIENCE Fall 2006–Spring 2007
 Undergraduate Teaching Assistant *with M. Cohen, S. Reichenbach, and L. Soh*
 Provided direct support for two years of a freshman-year honors course where programming languages and object-oriented design were introduced to students with a variety of majors.

Service

Referee, *Discrete Mathematics*, 2011.

Referee, *ACM Transactions on Computation Theory*, 2009.

Co-organizer, *Computer Science Theory Seminar*, Fall 2010.

Graduate Student Representative, *Mathematics Department Graduate Advisory Committee*, 2011-2012.

Graduate Student Representative, *Computer Science Department Curriculum Committee*, Spring 2009.

Research Software

All research software is available at <http://www.math.unl.edu/~s-dstolee1/SearchLib/>

TREESearch

An abstract implementation of a backtracking search to allow automatic parallel job generation. Includes scripts for input/output management on a grid using the Condor scheduler. Forms the base of all other projects in *SearchLib*.

EARSearch

Generates 2-connected graphs by ear decompositions using an isomorph-free generation scheme. Described in “Isomorph-free generation of 2-connected graphs with applications” and used in “Generating p -extremal graphs.”

CHAINCOUNTING

Generates width-two posets and counts the number of chains in each, searching for representations of all positive integers. Found representations for all integers up to 7.38 million. Joint work with E. Kupin and B. M. Reiniger.

SATURATION

Generates uniquely K_r -saturated graphs using a custom augmentation. Uses orbital branching or isomorph-free generation. Found several new graphs, including one that breaks a conjecture. Joint work with S. G. Hartke.

PROGRESSIONS

Searches for extremal colorings of $\{1, \dots, n\}$ which avoid different types of progressions which generalize arithmetic progressions. Also restricts to symmetric colorings of $\{1, \dots, n\}$. Joint work with A. S. Jobson and A. E. Kézdy.