

# Stephen G. Hartke

---

Department of Mathematics  
University of Illinois at Urbana-Champaign  
273 Altgeld Hall, MC-382  
1409 W. Green Street  
Urbana, IL 61801-2943

office: (217) 265-6760  
fax: (217) 333-9576  
  
hartke@math.uiuc.edu  
www.math.uiuc.edu/~hartke

---

**Research Interests:** Discrete mathematics, including graph theory, combinatorics, probability, and discrete optimization; and applications of discrete mathematics, particularly to biology and computer science.

**Education:** **Ph.D. in Mathematics**, received Oct, 2004; advisor: Fred S. Roberts  
**Rutgers University**, New Brunswick, New Jersey, 9/99-10/04  
  
**B.S. in Mathematics and Computer Science**, received May, 1999  
**University of Dayton**, Dayton, Ohio, 8/95-5/99  
Minors in Physics and English; Honors Program; graduated *summa cum laude*

**Positions Held:** **VIGRE Research Assistant Professor**, Department of Mathematics,  
University of Illinois at Urbana-Champaign, 8/04-  
**Instructor and Teaching Assistant**, Department of Mathematics,  
Rutgers University, New Brunswick, New Jersey, 5/03-7/03, 9/02-12/02, 1/02-5/02  
**Research Advisor** at the Research Experience for Undergraduates,  
University of Minnesota, Duluth, 6/00-8/00, 6/01-8/01  
**Cryptologic Mathematician**, Director's Summer Program,  
National Security Agency, Fort George G. Meade, Maryland, 6/99-8/99  
**Teaching Assistant**, Department of Mathematics,  
University of Dayton, Ohio, 1/98-5/98, 8/98-12/98

**Teaching Experience:** **University of Illinois** at Urbana-Champaign  
Graph Theory, *fall 2006, spring 2005, fall 2004*; Probability, *fall 2006*; Linear Programming and Combinatorial Optimization, *spring 2006*; Combinatorics, *fall 2005*  
**Rutgers University**, New Brunswick, New Jersey  
Linear Algebra, *summer 2003*; Calculus II (TA), *fall 2002*, Calculus I (TA), *spring 2002*  
**University of Dayton**, Ohio  
Calculus I (TA), *fall 1998*; Calculus II (TA), *spring 1998*

**Awards and Honors:** Named on the **Incomplete List of Teachers Ranked Excellent**,  
University of Illinois at Urbana-Champaign, *spring 2006, fall 2004*  
**National Science Foundation Graduate Research Fellowship**, 9/99-8/00, 9/03-8/04  
**National Defense Science and Engineering Graduate Fellowship**, 9/00-8/03  
**DIMACS Graduate Student Award**, 7/04  
Graduated **summa cum laude** from the University of Dayton, 5/99;  
University of Dayton College of Arts and Sciences **Dean's List**, 8/95-5/99  
**Honor's Program**, University of Dayton, 8/95-5/99  
one of 40 students selected from incoming freshman class of 1500

**Awards  
and  
Honors:**  
*continued*

- Faculty Award for Excellence in Mathematics**,  
University of Dayton Department of Mathematics, 5/99
- Sigma Xi Undergraduate Research Award for Excellence**,  
University of Dayton Chapter, 3/99
- Best Presentation Award**, for the talk Maximum Degree Growth of the Iterated Line Graph,  
Pi Mu Epsilon Student Conference, MAA MathFest, Toronto, 7/16/98

**Research  
Publications:**

- Stephen G. Hartke and Jennifer Vandenbussche, **On a question of Sós about 3-uniform friendship hypergraphs**, submitted.
- József Balogh, Stephen G. Hartke, Qi Liu, and Gexin Yu, **First-Fit chromatic number of planar and random graphs**, submitted.
- Michael Ferrara, Ronald Gould, and Stephen G. Hartke, **The structure of 2-factors in iterated line graphs**, submitted.
- Kyung-Won Hwang, Stephen G. Hartke and Naeem Sheikh, **A note on divisibility of the number of matchings of a family of graphs**, submitted.
- Jeong-Ok Choi, Stephen G. Hartke, and Hemanshu Kaul, **Distinguishing chromatic number of cartesian products of graphs**, in revision.
- Michael D. Barrus, Stephen G. Hartke, and Mohit Kumbhat, **Graph classes characterized both by forbidden subgraphs and degree sequences**, in revision.
- Stephen G. Hartke, Jennifer Vandenbussche, and Paul Wenger, **Further results on bar  $k$ -visibility Graphs**, *SIAM J. of Disc. Math.*, accepted.
- Stephen G. Hartke and Kathleen Ponto,  **$k$ -ordered hamiltonicity of iterated line graphs**, submitted.
- Stephen G. Hartke, **Attempting to narrow the integrality gap for the firefighter problem on trees**, *Discrete Methods in Epidemiology*, J. Abello and G. Cormode, eds., DIMACS Series in Discrete Mathematics and Theoretical Computer Science, 70 (2006), 179–185.
- Mike Develin and Stephen G. Hartke, **Fire containment in grids of dimension three and higher**, submitted.
- Stephen G. Hartke, **The voter model with confidence levels**, DIMACS Technical Report 2003–45.
- Stephen G. Hartke, **The elimination procedure for the competition number is not optimal**, *Discrete Applied Math.*, 154 (2006), no. 11, 1633–1639.
- Wiebke S. Diestelkamp, Stephen G. Hartke, and Rachael H. Kenney, **On the degree of local permutation polynomials**, *J. of Combin. Math. and Combin. Comput.*, 50 (2004), 129–140.
- Stephen Hartke, **The elimination procedure for the phylogeny number**, *Ars Combinatoria*, 75 (2005), 297–311.
- Mike Develin, Stephen Hartke, and David Petrie Moulton, **A general notion of visibility graphs**, *Discrete and Comput. Geom.*, 29 (2003), no. 4, 511–524.
- Stephen G. Hartke and Aparna W. Higgins, **Minimum degree growth of the iterated line graph**, *Ars Combinatoria*, 69 (2003), 275–283.
- Danielle Bianco, Olivia M. Carducci, Stephen Hartke, and Anne Larimer, **Stable matchings in the couples problem**, *Morehead Electron. J. of Applicable Math.*, Issue 2, MATH–2001–06, January 16, 2002.
- Stephen G. Hartke and Aparna W. Higgins, **Maximum degree growth of the iterated line graph**, *Electron. J. of Combin.*, 6 (1999), #R28.
- Stephen G. Hartke, **Binary De Bruijn cycles under different equivalence relations**, *Discrete Math.*, 215 (2000), 93–102.

- Other Publications:** Stephen G. Hartke, Daniel C. Isaksen, and Philip Matchett Wood, **Graduate students as mentors in mathematics REUs**, *Proc. of the Conference on Promoting Undergraduate Research in Mathematics*, J.A. Gallian, ed., Amer. Math. Society (2007), in preparation.
- Stephen G. Hartke, **A survey of free math fonts for TeX and LaTeX**, *The PracTeX Journal*, (2006) no. 1.
- Stephen G. Hartke, **Summer mathematics research experiences**, *Proc. of the Conference on Summer Undergraduate Math. Research Programs*, J.A. Gallian, ed., Amer. Math. Society (2000), 267–271.
- Service:** **Member** of the MAA Committee on Graduate Students, 1/07-
- Co-organizer** for the EXCILL conference on Extremal Combinatorics, University of Illinois, 11/18/06-11/20/06
- Developed and presented a day-long workshop on graph theory for 24 high school students during the **High School Math Days**, University of Illinois, 6/9/06
- Co-organizer** for the DIMACS/DIMATIA/Rényi Workshop on Graph Colorings and their Generalizations, 10/13/03-10/15/03
- Founding **Seminar Organizer** for the Graduate Student Combinatorics Seminar, Rutgers University, 1/03-2/04
- Refereed papers** for SIAM J. Disc. Math., 4/05; Disc. Math., 11/04, 7/06; Disc. Appl. Math., 10/00, 6/01, 7/06; J. of Graph Alg. and Appl., 1/06; Ars Combin., 5/04; Math. and Comput. Modelling, 11/04
- Judge** for the Illinois Council of Teachers of Mathematics (ICTM) High School Orals Competition, regional competition at Parkland College, 2/19/05, 2/18/06; and state competition at University of Illinois, 4/30/05
- Mentored undergraduate **Honors student** Ian Shipman, University of Illinois, 1/05-; Shipman received the department’s 2006 Greenwood and Trjitzinsky Prize for his paper “The Distinguishing Number of Iterated Line Graphs” based on our work together; the award is for the best paper in mathematics written by an undergraduate, 4/06
- Member of **Qualifying Exam** committees and **Doctoral Dissertation** committees, University of Illinois, 8/04-4/06
- Member of the **Computer Committee**, Rutgers Mathematics Department, 3/02-5/04
- College of Arts and Sciences Academic Affairs Committee**, University of Dayton, 8/97-5/99
- Research Presentations:** **DNA Codewords and De Bruijn Sequences**, AMS Session on Combinatorics, Joint AMS/MAA Meeting, New Orleans, 1/8/07
- Graph Classes Characterized Both by Forbidden Subgraphs and Degree Sequences**, Applied Mathematics Seminar, Illinois Institute of Technology, 10/26/06
- On a Question of Sós about 3-Uniform Friendship Hypergraphs**, Contributed Paper, Twentieth Midwest Conference on Combinatorics, Cryptography, and Computing, Wichita State University, 10/5/06
- First-fit chromatic number of planar and random graphs**, Graph Theory and Combinatorics Seminar, University of Illinois, 9/12/05
- Distinguishing Chromatic Number of Cartesian Products of Graphs**, SIAM Conference on Discrete Mathematics, Victoria, Canada, 6/25/06
- List Coloring and the Dinitz Conjecture**, REU presentation, Valparaiso University, 6/15/06
- Bar  $k$ -Visibility Graphs**, Seminar, Rose-Hulman Institute of Technology, 2/7/06

**Research Presentations:***continued*

- Further Results on Bar  $k$ -Visibility Graphs**, SIAM Minisymposium on Geometric Representations of Graphs (invited speaker), Joint AMS/MAA Meeting, San Antonio, 1/12/06
- 2-Factors in Iterated Line Graphs**, Graph Theory and Combinatorics Seminar, University of Illinois, 10/18/05
- A (Short) History of Iterated Line Graphs**, SIAM student speaker, Emory University, 6/10/05
- Foggy Visibility Graphs**, Graph Theory with Altitude (conference in celebration of Joan Hutchinson's 60th birthday), University of Colorado at Denver, 5/19/05
- Disease Containment by Progressive Vaccination on Trees and Grids**, DIMACS Epidemiology Minisymposium, Rutgers University, 4/25/05
- Disease Containment by Progressive Vaccination on Trees and Grids**, Department colloquium, University of Dayton, 3/3/05
- Fire Containment on Trees and Grids**, Discrete Mathematics Seminar, Texas A&M University, 4/8/05
- Fire Containment on Trees and Grids**, AMS Session on Combinatorics, Joint AMS/MAA Meeting, Atlanta, 1/7/05
- Fire Containment on Trees and Grids**, Discrete Mathematics Seminar, Dalhousie University, 11/24/04
- Fire Containment on Trees and Grids**, Graph Theory and Combinatorics Seminar, University of Illinois, 9/28/04
- Disease Spread on (graph-theoretical) Trees**, REU presentation, University of Minnesota, Duluth, 6/14/04
- A Fractional Analogue of Tutte's Perfect Matching Theorem**, Graduate Student Combinatorics Seminar, Rutgers University, 3/29/04
- Approximation Techniques for Integer Programming Problems**, Graduate Student Combinatorics Seminar, Rutgers University, 3/28/04
- Disease Spread on (graph-theoretical) Trees**, Seminar, U.S. Military Academy, West Point, New York, 2/24/04
- Disease Spread on (graph-theoretical) Trees**, Seminar, Lafayette College, 2/18/04
- Disease Spread on (graph-theoretical) Trees**, Seminar, Benedictine College, 2/12/04
- The Voter Model with Confidence Levels**, Seminar, Southern Illinois University Edwardsville, 2/9/04
- The Definition of the Derivative and When Knowing Everything Isn't Enough**, Expository seminar, College of William and Mary, 2/5/04
- Competition Graphs and Competition Numbers**, Seminar, College of William and Mary, 2/4/04
- The Elimination Procedure for the Competition Number is Not Optimal**, AMS Session on Graph Theory, Joint AMS/MAA Meeting, Phoenix, Arizona, 1/9/04
- The Voter Model with Confidence Levels**, Mathematics Seminar, Bell Laboratories, Murray Hill, New Jersey, 10/9/03
- The Voter Model with Confidence Levels**, Graduate Student Combinatorics Seminar, Rutgers University, 10/6/03
- The Voter Model with Confidence Levels**, Workshop on Extremal Combinatorics, Alfréd Rényi Institute of Mathematics, Budapest, Hungary, 4/16/03
- The Reverse Solitaire Army**, Graduate Student Seminar, Rutgers University, 3/28/03
- An Introduction to Algebraic Graph Theory**, Graduate Student Combinatorics Seminar, Rutgers University, 3/24/03

**Research Presentations:** *continued*

**The Voter Model with Confidence Levels**, AMS Session on Dynamical Systems, Joint AMS/MAA Meeting, Baltimore, 1/16/03

**Filled or Full of Holes?**, Graduate Student Seminar, Rutgers University, 3/27/02

**The Elimination Procedure for the Phylogeny Number**, Contributed Paper, Thirty-Third Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Florida Atlantic University, 3/5/02

**Minimum Degree Growth of the Iterated Line Graph**, AMS Session on Combinatorics, Joint AMS/MAA Meeting, New Orleans, 1/12/01

**Maximum Degree Growth of the Iterated Line Graph**, MAA Ohio Section Student Paper Session, University of Dayton, 3/26/99

**Binary De Bruijn Cycles under Different Equivalence Relations**, AMS Session on Combinatorics, Joint AMS/MAA Meeting, San Antonio, 1/15/99

**Maximum Degree Growth of the Iterated Line Graph**, Pi Mu Epsilon Student Conference, MAA MathFest, Toronto, 7/16/98; this talk won an award for "Best Presentation"

**Edge Density of Iterated Line Graphs**, MAA Ohio Section Student Paper Session, John Carroll University, 4/17/98

**Stable Matchings in the Couples Problem**, Pi Mu Epsilon Student Conference, MAA MathFest, Atlanta, 8/3/97

**Analysis of the Racquetball Scoring Method**, Pi Mu Epsilon Student Conference, Miami University, Ohio, 9/27/96

**Other Presentations:**

**Invited Panel Speaker** on preparation for graduate school, Twenty-second Biennial Alumni Seminar, Dept. of Mathematics, University of Dayton, 11/4/06

**Invited Participant**, AMS/NSA Conference on Promoting Undergraduate Research in Mathematics, Chicago, 9/28-30/06

**Invited Panel Speaker** for the Teaching Assistant Training Program, Dept. of Mathematics, Rutgers University, 4/9/02

**Getting Students Involved in Undergraduate Research**, copresented with J.A. Gallian and A.W. Higgins, MAA Minicourse at the Joint Mathematics Meetings in Washington, D.C., 1/21/00, in New Orleans, 1/12/01, and in San Diego, 1/8/02

**Invited Panel Speaker** at the AMS Conference on Summer Undergraduate Mathematics Research Programs, Crystal City, Virginia, 10/2/99

**Affiliations:**

- American Mathematical Society (AMS)
- Mathematical Association of America (MAA)
- Society for Industrial and Applied Mathematics (SIAM)
- Association for Women in Mathematics (AWM)
- Pi Mu Epsilon Honorary Math Society
- T<sub>E</sub>X Users Group (TUG)

**Citizenship:** United States citizen