

Curriculum Vitae

Garth Isaak

January 2018

Office: Department of Mathematics Lehigh University, Bethlehem, PA 18015, 610-758-3754

Home: 1541 County Line Road, Rosemont, PA 19010, 610-527-4206

email: gisaak@lehigh.edu

homepage: <http://www.lehigh.edu/~gi02/gi02.html>

Education:

- Ph.D. Interdisciplinary, from Rutgers Center for Operations Research (RUTCOR), Rutgers University, October 1990.
- B.A. summa cum laude, Bethel College, Kansas 1984, majors in Mathematical Sciences, Chemistry and Physics.

Academic Positions:

- Professor, Department of Mathematics, Lehigh University 2005 -
Department Chair 2016 -
College of Arts and Sciences Associate Dean for Graduate Studies, 2012 - 2016
- Associate Professor, Department of Mathematics, Lehigh University 1998 - 2005.
- Assistant Professor, Department of Mathematics, Lehigh University 1993 - 1998.
- Visiting Assistant Professor, Department of Mathematics, Lehigh University 1992 - 1993.
- John Wesley Young Research Instructor, Department of Mathematics and Computer Science, Dartmouth College, 1990 - 1992.
- Teaching Assistant, Departments of Mathematics and Computer Science, Rutgers University, 1985 - 1990.
- Mathematics Instructor, Bethel College, Kansas 1984 - 1985.
- Science Instructor, Hesston Junior College, 1984 - 1985.

Publications:

Articles in refereed journals

1. H. Abeledo and G. Isaak, A Characterization of Graphs that Ensure the Existence of Stable Matchings, *Math. Social Sciences*, **22** (1991) 93–96.
2. G. Isaak, S. Kim, T.A. McKee, F.R. McMorris and F.S. Roberts, 2-Competition Graphs, *SIAM J. Discrete Math.*, **5** (1992) 524–538.
3. G. Isaak, Bounded Discrete Representations of Interval Orders, *Discrete Appl. Math.*, **44** (1993) 157–183.
4. G. Hurlbert and G. Isaak, On the de Bruijn Torus Problem, *J. Combinatorial Theory A*, **64** (1993) 50–62.
5. G. Isaak, Scheduling Rooted Forests with Communication Delays, *Order*, **11** (1994) 309–316.
6. J.P. Barthelémy, O. Hudry, G. Isaak, F.S. Roberts and B. Tesman, The Reversing Number of a Digraph, *Discrete Appl. Math.*, **60** (1995) 39–76.
7. K.P. Bogart, P.C. Fishburn, G. Isaak and L. Langley, Proper and Unit Tolerance Graphs, *Discrete Appl. Math.*, **60** (1995) 99–117.

8. G. Hurlbert and G. Isaak, New Constructions for de Bruijn Tori, *Designs, Codes and Cryptography*, **6** (1995) 47–56.
9. G. Isaak, Tournaments as Feedback Arc Sets, *Electronic Journal of Combinatorics*, **2** (1995) #R20, 19pp.
10. J. Driscoll, D. Healy and G. Isaak, Scheduling Dyadic Intervals, *Discrete Appl. Math.*, **63** (1995) 101–116.
11. G. Hurlbert and G. Isaak, Equivalence Class Universal Cycles for Permutations, *Discrete Math.*, **149** (1996) 123–129.
12. G. Hurlbert and G. Isaak, On Higher Dimensional Perfect Factors, *Ars Combinatoria*, **45** (1997) 129–139.
13. K.P. Bogart and G. Isaak, Proper and Unit Bitolerance Orders, *Discrete Math.*, **181** (1998) 37–51.
14. G. Isaak, Powers of Hamilton Paths in Interval Graphs, *J. Graph Theory* **27** (1998) 31–38.
15. S. Donnelly and G. Isaak, Hamiltonian Powers in Threshold and Arborescent Comparability Graphs, *Discrete Math.*, **202** (1999) 33–44.
16. A.B. Evans, G. Isaak and D. Narayan, Representations of Graphs Modulo n , *Discrete Math.*, **223** (2000) 109 – 123.
17. K.P. Bogart, G. Isaak, J. Liason and A. Trenk, Comparability Invariance Results for Tolerance Orders, *Order*, **18** (2001) 281–294.
18. G. Isaak, Constructions for Higher Dimensional Perfect Factors, *Aequationes Math.*, **64** (2002) 70–88.
19. G. Isaak, Sum List Coloring 2 by n Arrays, *Electron. J. Combinatorics* **9** (2002) Note 8, 7 pp.
20. G. Isaak, K. Nyman and A. Trenk, A Hierarchy of Classes of Bounded Bitolerance Orders, *Ars Combinatoria*, **69** (2003) 33 – 53.
21. G. Isaak and D. Narayan, A Complete Classification of Tournaments having a Disjoint Union of Directed Paths as a Minimum Feedback Arc Set, *J. Graph Theory*, **45** (2004) 28 - 47.
22. G. Isaak and D. Narayan, A Classification of Tournaments having an Acyclic Tournament as a Minimum Feedback Arc Set, *Inf. Proc. Let.* **92** (2004) 107 - 111.
23. G. Isaak, Sum List Coloring Block Graphs, *Graphs and Combinatorics* **20** (2004) 499 - 506.
24. G. Isaak, Hamiltonicity of Digraphs for Universal Cycles of Permutations, *European J. Combinatorics*, **27** (2006) 801 - 805.
25. M.J. Fisher and G. Isaak, Distinguishing Colorings of Cartesian Products of Complete Graphs, *Discrete Mathematics* **308** (2008) 2240-2246 .
26. G. Isaak, R. Jamison, D. Narayan, Greedy Rankings and Arank Numbers, *Inf. Proc. Let.* **109** (2009) 825-827.
27. D.E. Brown, A.H. Busch and G. Isaak, Linear Time Recognition Algorithms and Structure Theorems for Bipartite Tolerance and Probe Interval Graphs, *Discrete Mathematics and Theoretical Computer Science*, **10** (2010) 63-82.
28. G. Isaak and D.B. West, The edge count criterion for graphic Lists, *Electronic Journal of Combinatorics*, **17** (2010) N36, 5 pp.

29. J. Hook and G. Isaak, Star Avoiding Ramsey Numbers, *Discrete Appl. Math.*, **159** (2011) 328–334.
30. M.J. Fisher and G. Isaak, Distinguishing numbers of Cartesian products of multiple complete graphs, *Ars Math. Contemp.* **5** (2012), 159 – 173.
31. G. Isaak, P.D. Johnson, C. Petrie, Caleb Integer and fractional security in graphs, *Discrete Appl. Math.* **160** (2012), 2060 – 2062.

Articles in refereed books and conference proceedings

32. G. Isaak and B. Tesman, The Weighted Reversing Number of a Digraph, *Congressus Numerantium*, **83** (1991) 115–124.
33. G. Hurlbert and G. Isaak, A Meshing Technique for de Bruijn Tori, *Contemporary Math.* **178** (1994) 153–160.
34. A.H. Busch and G. Isaak, Recognizing bipartite tolerance graphs in linear time, *Graph Theoretic Concepts in Computer Science*, Springer Lecture Notes in Computer Science **4769** (2007) 12 - 20.
35. G. Isaak, Interval Order representation via Shortest Paths, in *The Mathematics of Preference, Choice and Order Essays in Honor of Peter C. Fishburn*, Brams, S.; Gehrlein, W. V.; Roberts, F.S. (Eds.) (2009), 303-312. (paper invited for special volume and refereed)

Articles Submitted

36. G. Isaak, An Alternate Approach to Changing Sine
37. G. Isaak, Degree sequences for Multitrees
38. G. Isaak, Degrees and 2-Multitrees
39. B. Baker and G. Isaak, The k-Fixed endpoint Path Partition Problem on Unit Interval Graphs
40. G. Isaak and M. Prudente, Two Player Pebbling Game on Diameter 2 graphs
41. S. Boyadzhijka, G. Isaak, A. Trenk, A Simple proof Characterizing Interval orders with Lengths Between 1 and k
42. S. Boyadzhijka, G. Isaak, A. Trenk, Interval orders with Two Interval Lengths

Honors and awards

- Fellow of the institute for combinatorics and its applications (since 1997).
- Class of 1961 associate professor, Lehigh University 2001-2003.

Research funding

- Office of Naval Research 1994-1997, Interval Orders with Bounds and Tolerances (competitive grant).
- Reidler Foundation summer funding 1993, 1997, 1998, 2000-2004 (not competitive).

Professional presentations

Invited research presentations at departmental colloquia and seminars

- University of Illinois, June 2010.
- Rutgers Center for Operations Research Colloquium, September 2004.
- Arizona State University Colloquium, May 2004.
- Combinatorialists of New England conference, December 2000.

- University of Pennsylvania Combinatorics seminar, February 2000.
- Drexel University Mathematics Colloquium, November 1999.
- University of Delaware Combinatorics Seminar, April 1999.
- Dartmouth College combinatorics seminar, December 1995.
- Combinatorics Seminar, Arizona State University, November 1991.

Lehigh Colloquia and Seminars

- Mathematics Department Colloquia, September 1996, October 1997, September 1998, October 2002, October 2004.
- Lehigh Optimization seminar, September 2002 and October 2004.
- Industrial Engineering Seminar, November 1996 and October 1993.

Invited research presentations at conferences and conference special sessions

- Southeastern Conference on Combinatorics, Graph theory and Computing, special session on Structured Families of Graphs, Mathematical and Algorithmic Aspects, March 2017.
- Southeastern Conference on Combinatorics, Graph theory and Computing, March 2016, Plenary Speaker (2 talks).
- AMS (American Mathematical Society) special session on structural and extremal problems in graph theory, Washington D.C., March 2012.
- AMS/SIAM (American Mathematical Society/Society of Industrial and Applied Mathematicians) special session on graph coloring and graph partitioning, Washington D.C., January 2009.
- SIAM (Society for Industrial and Applied Mathematics) special session on distinguishing numbers, Burlington, June 2008.
- AMS/SIAM (American Mathematical Society/Society of Industrial and Applied Mathematicians) special session on graph coloring and graph partitioning, San Diego, January 2008.
- AMS (American Mathematical Society) special session on graph theory, Hoboken, April, 2007.
- SIAM (Society for Industrial and Applied Mathematics) special session in memory of K.P. Bogart, Victoria, June 2006.
- Midwest Conference on Combinatorics, Cryptography, and Computing, October 2004.
- Southeastern Conference on Combinatorics, Graph theory and Computing, special session on tolerance graphs and orders, March 2004.
- SIAM (Society for Industrial and Applied Mathematicians) special session on orders, San Diego, August 2002.
- AMS (American Mathematical Society) special session on graph theory, San Diego, January 2002.
- DIMACS (Center for Discrete Mathematics and Computer Science) workshop on tolerance graphs, July 2001.
- ORSA/INFORMS (Operations Research Society of America/ Institute for Operations Research and the Management Sciences) national conference special sessions; New York, October 1990, Anaheim, November 1991, Atlanta November 1996.
- AMS (American Mathematical Society) summer meeting, special session on algorithms for graphs and matroids, Burlington, August 1995.

- Advanced Research Institute for Discrete Applied Mathematics, Rutgers University June 1991 and June 1992.

Invited Research Talks for Undergraduates

- Wellesley College, October 2015 (Martha Davenport Heard Lecture).
- Swarthmore College, October 2013.
- West Chester University, November 2012.
- Bethel College Kansas, October 2011, STEM symposium speaker.
- Elizabethown College, April 2011 (Pi Mu Epsilon talk).
- Bucknell University, April 2008.
- Ursinus College, April 2008.
- California State University, Fresno, April 2006.
- Making the most of graduate school workshop, Lehigh University, April 2006.
- Messiah College, October 2002, October 1998 and December 1990.
- Gettysburg College, October 1999.
- Moravian College, October 1999, November 2000 and April 2010.
- DREI (Rutgers University, Discrete Research and Educational Institute) talk for high school teachers, July 1998.
- Lafayette College, (NSF research experiences program), July 1993.
- Bethel College, series of 3 lectures for undergraduates and one public lecture, January 1993.
- Dickinson College, October 1990.

Other Research Talks

- MAA EPADEL meeting, Fall 2016.
- Southeastern Conferences on Combinatorics, Graph theory and Computing, Boca Raton and Baton Rouge, Februaries/Marches 2017, 2015, 2014, 2013, 2011, 2009, 2008, 2007, 2006, 2003, 2002, 1999, 1996, 1994, 1991, 1990, 1989.
- Cumberland Conference on Combinatorics, graph Theory and Computing, May 2014.
- Shanks Conference on Cycles in Graphs, May 2012
- Midwest Conference on Combinatorics, Cryptography, and Computing, October 2009.
- CANADAM (Canadian Discrete and Algorithmic Mathematics) Banff, May 2007 and Montreal May 2009.
- Horizons in combinatorics conference, Vanderbilt University, May 2001.
- SIAM (Society for Industrial and Applied Mathematicians) Discrete Mathematics Conferences, Nashville June 2004, Minneapolis June 2000, Toronto July 1998, Baltimore June 1996, Albuquerque June 1994, Vancouver June 1992.
- AMS (American Mathematical Society) Joint Mathematics Meeting contributed sessions, Januaries, 2012, 2014.
- Quadrennial International Conferences on Graph Theory, Combinatorial Applications and Algorithms, Kalamazoo June 1996 and June 2000.
- ORDAL (Orders and Algorithms) Lyon France July 1994.

Course development

I have introduced the following courses: MATH 201 (1 credit), undergraduate problem solving;

MATH 251 (3 credits), undergraduate combinatorics; MATH 446 (3 credits) graduate combinatorics; MATH 448 (3 credits), graduate combinatorics and graph theory. MATH 251, 446, 448 have been replaced by MATH 305, enumerative combinatorics, MATH 311 (Graph Theory) and MATH 321 (Topics in Combinatorics) which I assisted in developing. I have (and continue to) develop Calculus with business applications (MATH 81).

Non-research advising

- Mathematics club co-advisor (periodically) 1993 - 2002.
- Putnam (annual nationwide mathematics contest) and Mathematical Modeling Contest advisor 1997 - 2001.
- 1998-2002 Mathematics majors co-advisor (approximately 30 students).
- First year student advisor to approximately 20 students, starting fall 1997, starting fall 2005 and starting fall 2007 and starting spring 2008

Graduate research advising - Ph.D. committee member

- Electrical Engineering (Hyung Lee 1994, Cindy Wang 1994-1996, Kai Ting Shen 1995, Prakash Math 2001-2004, Peiyu Tan, 2007-2009, Kai Xie 2008-2010,).
- Computer Science (Ozmun Guizide 1998-1999, Pauline Chu 1999-2003, Li Yu 2003-2004, Shenzhi Li 2003-2009, Lan Nie, 2006-2008, Murat Ganziz, 2006-2007,).
- Industrial Engineering (Kedar Naphende 1995-1997, Peiling Wu 1999-2001 , Nianpen Chen 2000-2003 , Jinlong Ban 2002-2004, Shangyuan Luo 2003-2004, Joao Goncalves 2003-2005, Ozer Ackus 2004-2006, Hyung-Mo Jeon 2005-2008, Menal Guzelsoy, 2006-2009, Wasu Glankwamdee, 2006-2008, Ozer Akus, 2007-2009, James Ostowski, 2007-2008, Kumar Abhishek 2007-2008, Ashtosh Mahajan 2007-2009, Ali Mohammad Nezhad 2015-).
- Mathematics (John Frohmeyer 2000-2002, Charles Buehrle 2008-2010, Justin Lambright 2010-2011, Brittany Shelton 2010-2013, Alex Halperin 2012-2014, James Long 2014-2015, Bill Franczak 2015-).

Graduate Research advising - Ph.D. Advisor

- Darren Narayan, 1998-2000, Ph.D. first job tenure track at Rochester Institute of Technology, currently tenured full professor.
- Trisha Moller, 2000-2004, Ph.D. first job tenure track at DeSales University, currently part time at Moravian College, part time at home.
- Brian Heinold, 2003-2006, Ph.D. August 2006 first job tenure track Mt. St. Mary's University currently tenured associate professor.
- Matt LaPadulla, 2004-2005, 2009. Did not complete.
- Jen Scancellia Gorman, 2004-2007 Ph.D. first job, tenure track at Gannon University, currently Mathematics Instructor at College of Southern Nevada.
- Ellen Panofsky, 2005-2008, Ph.D. first job, tenure track at Cabrini College, currently lecturer at Temple University.
- James Carroll, 2006-2009. Did not complete.
- Jonelle Hook, 2007-2010. Ph.D. tenure track job at Mt. St. Mary's University currently

Assistant Professor.

- Breeanne Baker, 2010-2014, Ph.D. first job, tenure track at The Citadel, currently assistant professor.
- Kathleen Ryan, 2010-2014, Ph.D. first job tenure track at DeSales University, currently assistant professor.
- Matt Prudente, 2011-2015, Ph.D. first job, St. Vincent College, currently assistant professor.
- Aydin Gerek, 2011-2016, Ph.D industry
- Stanley Florkowski 2015 - 2017, Currently Assistant Professor US Military Academy
- Caitlin Owens, 2015-
- Pam Kirkpatrick, 2015-

Undergraduate Research advising

- Sam Donnelly, 1996 - 1997, undergraduate thesis, entered graduate program in artificial intelligence, University of Georgia.
- co-advised 4 undergraduates (Kristen DiGiacomo, Providence College; Chor Ham Lam, Dartmouth College; Joe Tenini, Furman University; Olga Turanova, Bard College) for six week summer REU program (research experiences for undergraduates) at Lafayette College summer 2007.
- Advised 2 undergraduates, Matt Bevenour and Adam Yusko in six week summer REU program summer 2009.
- Adam Yusko, undergraduate thesis 2009-2010. Entered graduate program in mathematics at Western Michigan University.
- advised 4 undergraduates (Hannah Alpert, U Chicago, Amy Becker, Carelton College, James Hilbert, Lafayette College, Jenny Iglesias, Harvey Mudd College) for six week summer REU program (research experiences for undergraduates) at Lafayette College summer 2010.

University Service

Service to University

- Member, Industrial Engineering Search Committee for Department Chair
- Member, Faculty Compensation Committee
- Multiple committees as Associate Graduate Dean, 2012- 2016
- ECE (electrical and computer engineering) search committee for 2 positions, 2001 - 2002.
- Member, University Committee on Discipline, 2002 - 2006.
- Search committee for senior hire in Industrial engineering 2009-2012.
- Organizational committee for INE (Integrate Networks in Engineering) Cluster workshop and co-chair of faculty search committee for 2 positions in quantitative methods for smart grids 2011-2012.

Service to College

- Task force on the freshman year experience, spring 1998.
- Committee on Computer Science BA, spring 1999.
- Committee on teaching evaluations, spring 2000.

- Dean's scholarship committee Spring 2002, Spring 2006.
- College Policy Committee, Fall 2006.
- College Policy Committee, Spring and Fall 2008.
- Committee on Research, Scholarship and Creative Work, Fall 2008 - Spring 2012.
- Promotion Committee 2009 - 2012.
- Member, College of Arts and Sciences Dean Search Committee, 2010 - 2011.
- Associate Dean for Research and Graduate studies July 2012 -

Service to Department

- Planning Committee, 1998 - 1999.
- Hiring plan committee 1999.
- Mathematics chair search committee 2000 - 2001.
- Mathematics postdoctoral position search committee 2001 - 2002.
- Chair's advisory committee, 2001-2003, 2004-2005, 2007-2012.
- Graduate Coordinator, 2002-2005.
- Algebra Search Committee, 2005-2006.
- Professor of Practice Math Search Committee, 2014-15.
- Applied Math Search Committee, 2013-14.
- Algebra Math Search Committee Chair, 2015-16.
- Statistics Search Committee, 2005, 2007, 2008, 2009, 2010.
- Attend NSF funding opportunities conference, Washington DC, May 2003, May 2004.
- Calculus Committee, 2006 - 2012.
- Associate Chair Fall 2008 - summer 2012.
- Organizer of Pitcher lecture series 2008 and 2009.
- Mathematics Building Renovation Committee 2015-.
- ADVANCE Male Advocates Group Member.

Faculty Development

- Attended Lily conference on teaching, Miami University, Ohio October 1993 and present conference information at faculty development lunch.
- Organized discussion (with R. Barnes) on critical thinking faculty development lunch March 1994.
- Co-organizer regional Project Kaleidoscope conference, Lehigh University Feb 1997.
- Attended Project Kaleidoscope conferences on teaching, Kansas City September 1998, College Park October 1999.
- Attend AAHE (American Association on Higher Education), conference on the future of faculty roles and rewards, Feb 2001, present at faculty development lunch, Feb 2001.
- Attend Council on Graduate Schools conferences, July 2012 and December 2014.

External Professional Activities/Service

- External examiner Swarthmore college honors program May 1994, May 1996, May 2006 and May 2009.
- Assist in running graph theory workshop for high school teachers at DIMACS center, Rutgers University, July 1998.
- July 2001, Organizer, research workshop on tournaments at DIMACS center Rutgers University, run in parallel with an education program for high school teachers.

- Assist in Lehigh Valley High School Mathematics Contest (run session reviewing problems after contest) each year March 1995 - 1999, 2001, 2002.
- Liaison to Marvine Elementary School, spring 2000.
- Secretary of Discrete Mathematics Activities group, SIAM (Society for Industrial and Applied Mathematics) elected fall 1999 to term 2000 - 2002.
- Member American Mathematical Society (AMS) 1989 - . Mathematical Association of America (MAA) 1984 - . Society of Industrial and Applied Mathematicians (SIAM) 1988 - . Institute for Operations Research and Management Science (INFORMS) (1990-2004). Institute for Combinatorics and its Applications 1996 - . Peace Science Society (PSSI) (1990 - 2000).
- Editorial Board, *Advances and Applications in Discrete Mathematics*, 2008-. ISRN *Discrete mathematics*, 2011-2014.
- Journal reviewer (Over 140 papers total), *Algorithmica*, *Australasian Journal of Combinatorics*, *Discrete Mathematics*, *Discrete math and theoretical Computer Science*, *Discrete Applied Mathematics*, *Graphs and Combinatorics*, *Journal of Combinatorics Information and System Sciences*, *Journal of Combinatorial Mathematics and Combinatorial Computing*, *Journal of Combinatorial Theory Series A*, *Journal of Computational and Applied Mathematics*, *Journal of Graph Theory*, *Journal of Mathematical Psychology*, *Mathematical Social Sciences*, *Mathematics Magazine*, *Order*, *SIAM Journal of Discrete Mathematics*, *Journal of Computational and Applied Mathematics*, *Networks*, *Graph Theory Notes of New York*, *Operations Research Letters*, *Electronic Journal of Combinatorics*, *American Mathematical Monthly*, *Annals of Combinatorics*, *Discussiones Mathematicae Graph Theory*, *Computers and Mathematics with Applications*, *Bulletin of the Institute of Combinatorics and its Applications*, *SIAM Journal of Computing*, *International Journal of Computer Mathematics*, *Mathematics Magazine*.
- Reviewer for at least 6 combinatorics textbooks and CRC handbook.
- Reviewer for various agency proposals.
- Reviewer for various tenure and promotion cases.
- Reviewer for *Mathematical Reviews*, 60+ papers.