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EDUCATION

- Aug 1995 – Aug 2002 **Ph.D. Mathematics**, University of Illinois, Urbana-Champaign.
Thesis: *Equitable list coloring, induced linear forests, and routing in rooted graphs* Thesis Advisor: Professor Douglas B. West.
Fellowship, January 2001–August 2002.
- Aug 1995 – June 1997 **M.S. Mathematics**, University of Illinois, Urbana-Champaign.
- Aug 1991 – June 1995 **B.A. Mathematics with Honors**, Williams College, Williamstown MA.
Thesis: *Bumper Drawings: A New Type of Proximity Drawing* Thesis Advisor: Professor William J. Lenhart. Participated in two REUs: at Williams in 1993 (SMALL) and at the Geometry Center in 1994.

PROFESSIONAL HISTORY

- Sept 2002 – present **Assistant Professor**, Department of Applied Mathematics, Illinois Institute of Technology. (Details given below.)
- June 2000 – Aug 2000 **REU Mentor**, University of Illinois, Urbana-Champaign.
For a Research Experience for Undergraduates in Mathematical Graphics directed by Professor George K. Francis. Widely-varying responsibilities.
- Aug 1995 – Dec 2000
(except Fall 1999) **Teaching Assistant**, University of Illinois, Urbana-Champaign.
Instructor with full responsibility for courses from Finite Mathematics to Multivariable Calculus taught in traditional lecture, group learning, and computer-based formats. Earned Graduate Teacher Certificate.
- June 1999 – Aug 1999 **Research Assistant**, University of Illinois, Urbana-Champaign.
For Professor George K. Francis.
- Aug 1999 – Dec 1999 **Research Assistant**, University of Illinois, Urbana-Champaign.
For Professor Zoltán Füredi.
- Jan 1992 – May 1993 **Teaching Assistant**, Williams College, Williamstown MA.
Grader for Discrete Mathematics, lab assistant for computer science classes.

ACADEMIC CONCENTRATIONS AND RESEARCH INTERESTS

Research Area

Discrete Applied Mathematics: Graph Theory, Combinatorics, Algorithms and Complexity.

Specific Topics

Topological Graph Theory: graph drawing, crossing numbers, confluency, planar graphs, graphs on surfaces; *Graph and Hypergraph Coloring*: equitable list coloring, nonrepetitive (square-free) coloring, edge colorings, upper chromatic number; *Induced Subgraphs*: feedback vertex set, induced linear forests, induced matchings; *Other topics*: domination, toughness, connectivity, centrality.

Types of results

Extremal bounds, polynomial-time algorithms, approximation algorithms, standard complexity (proofs of NP-hardness), parameterized complexity, results for restricted graph classes, and applications to routing/communication in computer networks.

PUBLICATIONS

Some of my papers have appeared or will appear in different publications, e.g., a shorter early version in conference proceedings followed by a full version in a journal. Multiple versions of the same work will be grouped together, and projects will be indexed by the date of the most recent version. *All publications other than the technical reports have been or will be refereed.*

Published and Submitted

A list analogue of equitable coloring, *J. Graph Theory* 44(3), 2003, 166–177.

with A. V. Kostochka and D. B. West.

Maximum induced linear forests in outerplanar graphs, *Graphs Combin.* 20(1), 2004, 121–129.

Equitable list-coloring for graphs of maximum degree 3, *J. Graph Theory* 47(1), 2004, 1–8.

The toughness of a toroidal graph with connectivity 3 and girth 6 is exactly 1, *Graphs Combin.* 20(2), 2004, 181–183.

with W. Cao.

Parameterized Algorithms for Feedback Vertex Set, in *IWPEC 2004*, Lecture Notes in Comput. Sci. 3162, Springer, Berlin, 2004, 235–247.

with I. Kanj and M. Schaefer.

Graph minors and reliable single message transmission, *SIAM J. Discrete Math.* 19(4), 2005, 815–847.

with F. E. Fich, A. Kündgen, and R. Ramamurthi.

Integer Programming Solutions for Several Optimization Problems in Graph Theory, in *Computers and Their Applications (CATA 2005)*, 2005, 50–55.

Also published as a DIMACS technical report (2005).

with J. Luttamaguzi, Z. Shen, and B. Yang.

Transversal numbers of translates of a convex body, *Discrete Math.* 306(18), 2006, 2166–2173.

with S.-J. Kim, K. Nakprasit, and J. Skokan.

Equitable list coloring for graphs of bounded tree-width, *submitted to J. Graph Theory*, June 2006.

Odd Crossing Number and crossing number are not the same, *Discrete Comput. Geom.*, to appear (published online: 20 March 2006).

Odd crossing number is not crossing number, in *Graph drawing*, Lecture Notes in Comput. Sci. 3843, Springer, Berlin, 2006, 386–396.

Also published as DePaul University Technical Report, TR 05-005, April 2005.

with M. Schaefer and D. Štefankovič.

Removing even crossings, *J. Combin. Theory Ser. B* 97(4), 2007, 489–500.

Removing even crossings, in *2005 European Conference on Combinatorics, Graph Theory and Applications (EuroComb '05)*, Stefan Felsner (ed.), Discrete Mathematics and Theoretical Computer Science Proceedings AE, 105–110.

Also published as DePaul University Technical Report, TR 05-013, September 2005.

with M. Schaefer and D. Štefankovič.

Train tracks and confluent drawings, *Algorithmica* 47(4), 2007, 465–479.

with P. Hui, M. Schaefer, and D. Štefankovič.

k -robust single-message transmission, *submitted to SIAM J. Discrete Math.*, April 2007.

k -robust single-message transmission, in *Combinatorial and algorithmic aspects of networking (CAAN 2004)*, Lecture Notes in Comput. Sci. 3405, Springer, Berlin, 2005, 90–101.

with A. Kündgen and R. Ramamurthi.

Removing even crossings on surfaces, *2007 European Conference on Combinatorics, Graph Theory and Applications (EuroComb '07)*, Electronic Notes in Discrete Mathematics, to appear.

Also published as “Removing even crossings, continued”, DePaul University Technical Report, TR 06-016, August 2006.

with M. Schaefer and D. Štefankovič.

Crossing Number of Graphs with Rotation Systems, *Graph Drawing 2007*, Lecture Notes in Comput. Sci., to appear.

Also published as DePaul University Technical Report, TR 05-017, November 2005.

with M. Schaefer and D. Štefankovič.

Crossing Numbers and Parameterized Complexity, *Graph Drawing 2007*, Lecture Notes in Comput. Sci., to appear.

Also published as DePaul University Technical Report, TR 06-013, August 2006.

with M. Schaefer and D. Štefankovič.

Axiomatization of the Center Function on Trees, *Australas. J. Combin.*, accepted August 2007.

Also published as Econometric Institute Technical Report, September 13, 2006.

with H. M. Mulder and K. B. Reid.

Δ_k and O_k confluent graphs, manuscript, June 2007.

Also published as DePaul University Technical Report, TR 07-004, June 2007.

with M. Schaefer and K. Stern.

Fast edge colorings with fixed number of colors to minimize imbalance, *submitted to Journal of Graph Algorithms and Applications*, June 2007.

Fast edge colorings with fixed number of colors to minimize imbalance, in *Foundations of Software Technology and Theoretical Computer Science 2006 (FSTTCS 2006)*, Lecture Notes in Comput. Sci. 4337, Springer, Berlin, 2006, 117-128.

Minimizing Tunable Ports in Optical Networks, to appear in *Combinatorial and algorithmic aspects of networking (CAAN 2005)*, Internet Mathematics.

with G. Călinescu.

Nonrepetitive colorings of graphs of bounded tree-width, *Discrete Math.*, special issue for the 60th birthday conference of M. Simonovits, accepted August 2007.

with A. Kündgen.

On the induced matching problem, *submitted to a conference with proceedings*, September 2007.

with I. Kanj, M. Schaefer, and G. Xia.

Generalized centrality in trees, *submitted to Discuss. Math. Graph Theory*, October 2007.

Also published as Econometric Institute Technical Report, EI 2006-16, Apr 18, 2006.

with H. M. Mulder and K. B. Reid.

Work in Progress

New proofs for strongly chordal graphs and chordal bipartite graphs,

with J. Tokaz and D. B. West.

Maximum induced forests in graphs of bounded treewidth,

with G. G. Chappell.

Upper chromatic number for random hypergraphs,

with J. Skokan.

Dominating sets in plane triangulations,

with E. L. C. King.

CONTRIBUTIONS TO TEACHING

- MATH 100 Introduction to the Profession (2 credit hours, Fall 2006, Fall 2007)
I developed the course in consultation with other members of the department, which was taught for the first time in Fall 2006. I teach several of the class meetings and I have supervised two student projects (4 students). The teaching and group project supervision was shared among several professors; this is largely coordinated by myself.
- MATH 151 Calculus I (5 credit hours, Fall 2002 ($\times 2$), Fall 2005, Fall 2006, Fall 2007)
Developed and revised Maple labs and a new “Writing and Communication” project, every semester.
- MATH 152 Calculus II (5 credit hours, Fall 2004)
Developed Maple labs and a “Writing and Communication” project.
- MATH 230 Introduction to Discrete Mathematics
(3 credit hours, Spring 2005, Spring 2006, Spring 2007)
Prompted by changes elsewhere in the Applied Mathematics Department curriculum, I revised this course in Summer 2006 in consultation with Matt Bauer, the CS 330 instructor (MATH 230 and CS 330 are interchangeable with respect to requirements for students).
- MATH 453 Combinatorics (3 credit hours, Spring 2005, Spring 2006)
Taught by “Guided Discovery” method: Students work on problem sets, designed to lead to and then reveal the central theorems and methods of enumerative combinatorics. Students develop problem-solving skills by working together in groups, presenting solutions in class, critiquing those solutions, and revising their work until it is of a very high quality.
- MATH 454 Graph Theory and Applications (3 credit hours, Spring 2003, Fall 2004, Fall 2006)
Revised curriculum and switched books for Spring 2003 and for Fall 2004.
- MATH 491 Reading and Research (3 credit hours, Fall 2004 ($\times 2$), Fall 2005, Spring 2006)
Fall 2004: Asim Khan read several chapters of *Winning Ways*, a bit of *On Numbers and Games*, and a paper from *More Games of No Chance*. The latter led to him being able to answer a small open problem in Combinatorial Game Theory. Kim Smith read and presented sections from *Proofs From The Book*.
Fall 2005–Spring 2006: Research by undergraduate student James Pierce on central substructures of trees. He rediscovered a fast algorithm for p -centers in trees and spoke about his work at an undergraduate mathematics conference at the University of Dayton in October 2005, at Midwest Theory Day (a computer science conference) in December 2005, and at the 2006 Chicago Area Undergraduate Research Symposium.
- MATH 553 Discrete Applied Mathematics I (3 credit hours, Fall 2003, Fall 2005, Fall 2006)
Different curriculum each time: Fall 2003 was enumerative combinatorics and graph theory using Douglas B. West’s *Combinatorics: A Core Course (Fall 2003 edition)*; Fall 2005 was based on Van Lint and Wilson’s *A Course In Combinatorics* and supplemented by West’s *Introduction to Graph Theory*, Cameron’s *Combinatorics*, and survey papers on design theory (including (t, m, s) -nets); Fall 2006 was all graph theory, using West’s *Introduction to Graph Theory* and Diestel’s *Graph Theory*.
- MATH 554 Discrete Applied Mathematics II (3 credit hours, Spring 2004)
Used West’s *Combinatorics: A Core Course (Fall 2003 edition)*. Topics included partially ordered sets, Turan’s theorem, Ramsey theory, and the probabilistic method.
- IPRO 330 Dynamic and Contemporary Science Fair Projects for Chicago Public Schools
(3 credit hours, Spring 2007, Fall 2007)
I assisted in developing, proposing, and leading the class in Spring 2007, and I am (co)leading IPRO 330 in Fall 2007.

Other contributions

I developed a syllabus for MATH 410 Number Theory, and assisted with updating some other courses. I advised more undergraduate student research (Panayiota Vassiliou, Fall 2003; Michael Lenzen, Summer 2006), and I arranged to have various undergraduate researchers speak at conferences and IIT seminars/colloquia. I have been a member of two Ph.D. thesis committees in Computer Science at IIT.

PROFESSIONAL ACTIVITIES

Referee

Algorithmica, Ars Combinatorica, Discrete Applied Mathematics, Discrete Mathematics (5), Electronic Journal of Combinatorics, Journal of Combinatorial Theory Series B, Journal of Graph Theory (3), Networks (2), SIAM Journal of Discrete Mathematics, Soft Computing minitrack of the 37th Hawaii International Conference on System Sciences (HICSS-37).

Organize (with H. Kaul)

Special Session on Graph Theory at the AMS Central Section Meeting Fall 2007, Chicago, IL, October 5-6, 2007.

Project NExT Fellow, 2003-2004 (New Experiences in Teaching, MAA)

This a professional development program for recent Ph.D.s in the mathematical sciences. It addresses all aspects of an academic career: improving the teaching and learning of mathematics, engaging in research and scholarship, and participating in professional activities.

Professional Societies Member of AMS, MAA, SIAM (SIAG on Discrete Mathematics)

Presentations given

Sep	2007	Paper at EUROCOMB 2007, Seville, Spain.
Mar	2007	Invited talk at AMS Special Session on Graph Theory, Central Section Meeting, Miami, OH.
Mar	2007	Invited talk at AMS Special Session on Algebraic and Extremal Combinatorics, Southeastern Section Meeting, Davidson, NC. (<i>DID NOT ATTEND, because my flight was cancelled</i>)
Dec	2006	GE Research, Bangalore, India.
Dec	2006	FSTTCS 2006, Kolkatta, India.
Oct	2006	BIRS workshop in Topological graph theory and crossing numbers, Banff, Canada.
Jun	2006	Geometric Graph Theory I Minisymposium, SIAM Conference on Discrete Mathematics, University of Victoria, British Columbia, Canada.
Oct	2005	Invited talk at AMS Special Session on Graph Theory, Central Section Meeting, Lincoln, NE.
May	2005	Invited talk at Graph Theory with Altitude: Conference in Honor of Joan P Hutchinson on the Occasion of her 60th Birthday, U. Colorado at Denver.
Mar	2003, 2005	36th and 34th Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Boca Raton, FL.
Aug	2004	Invited paper session on "SMALL" mathematics, Mathfest, Providence, RI.
Aug	2004	Workshop on Combinatorial and Algorithmic Aspects of Networking, Banff International Research Station, Canada.
Oct	2003	Discrete Mathematics and its Applications, Miami University, Oxford, OH.
2000, 2002, 2003		Midwest Graph Theory XXXIII, XXXV, and XXXVII.
Apr	2003	Invited talk at AMS Special Session on Graph Theory, Central Section Meeting, Bloomington, IN.
Jan	2002	Invited talk at AMS Special Session on Graph Theory, Joint Mathematics Meeting, San Diego, California.
May	2001	Horizons in Combinatorics, Vanderbilt University, Nashville, Tennessee.
2000 — 2005		Seminars/Colloquia at: Theoretical Computer Science at Depaul University (4), Benedictine University Math Club, Combinatorics at University of Illinois Chicago, Mathematics at California State University San Marcos, Applied Mathematics (8), Computer Science, Electrical and Computer Engineering, and Math Club (2) at Illinois Institute of Technology, Mathematical Sciences at Indiana-Purdue University Fort Wayne, Discrete Mathematics at Illinois State University (2), Graph Theory and Combinatorics at University of Illinois Urbana-Champaign (5?).

Workshops and conferences attended

Oct	2007	AMS Central Section Meeting, Chicago, IL.
Dec	2006	ISAAC 2006, Kolkatta, India.
Nov	2006	EXCILL, Urbana-Champaign, IL.
Apr	2004, 2005	Illinois MAA Sectional Meeting, Schaumburg, IL & Galesburg, IL.
Jul	2004	Graph Theory 2004: A conference in memory of Claude Berge, Paris, France.
Jun	2004	DIMACS Reconnect Satellite Conference 2004: Experimental Algorithmics, with a Focus on Branch and Bound for Discrete Optimization Problems, Lafayette College, Easton, PA.
Jun	2004	SIAM Conference on Discrete Mathematics, Nashville, TN.
Jun	2004	The Combinatorics of Large Sparse Graphs, NSF-CBMS Conference, featured speaker Fan Chung Graham, California State University, San Marcos.
Mar	2004	7th Legacy of R.L. Moore Conference Austin, TX.
Jan	2004	Joint Mathematics Meeting (as a Project NExT fellow), Phoenix, AZ.
2002 and	2003	Midwest (Computer Science) Theory Day CTI, Depaul University, Chicago, IL, and Illinois Institute of Technology, Chicago, IL.
Aug	2003	Teaching Introductory Combinatorics by Guided Group Discovery, Dartmouth College, Hanover, New Hampshire.
Jul/Aug	2003	Project NExT Workshop and MathFest 2003, Boulder, CO.
Jul	2003	Centrality in Graphs with Applications to Facility Location, DIMACS Reconnect 2003, Illinois Institute of Technology, Chicago, IL.
Jun	2003	Workshop on Extremal Graph Theory (in honor of the 60th birthday of Miklos Simonovits) Week 2, Csopak, Lake Balaton, Hungary.
Jun	2003	WG 2003, 29th International Workshop on Graph-Theoretic Concepts in Computer Science, Elspeet, The Netherlands.
Aug	2002	SIAM Conference on Discrete Mathematics, San Diego, California.
May	2002	Structure and Decomposition of Graphs, East Tennessee State University, Johnson City, Tennessee.
Jul	2001	DCI 2001, Graph Theory and its Applications to Problems of Society Week 2, DIMACS Center, Rutgers University, Piscataway, New Jersey.
May	1999, 2001	12th and 14th Cumberland Conference, University of Louisville, Louisville, Kentucky, and University of Memphis, Memphis, Tennessee.
Jul	2000	Summer Graduate Program and Workshop, MSRI, Berkeley, California.
Oct	1999	13th Midwest Conference on Combinatorics, Cryptography & Computing, Illinois State University, Normal, Illinois.

UNIVERSITY SERVICE

Department positions

- Newsletter Editor, Spring 2006–present
 - led the development of the first Applied Mathematics Department newsletter
- Applied Mathematics Department Computer Coordinator, Summer 2005–present
- Applied Mathematics Department Webmaster, Summer 2005–present
- Math Club/Math Competition advisor, 2003–present
 - weekly problem-solving/pizza sessions, additional social events
 - increasing number of talks (from two/year to several/year)
 - several students attend math conferences each year
 - students participated in the Putnam Competition, Virginia Tech Regional Competition, ISMAA competition, and the Math Modeling contest
 - student teams placed 4th in the 2005 ISMAA competition; 1st, 2nd, & 4th in the 2006 ISMAA competition; and 2nd & 3rd in the 2007 ISMAA competition

Committee work

- University Minority Retention Sub-Committee, Spring 2007–present
- University Graduate Studies Committee, Fall 2006–Summer 2007

- Applied Mathematics Department Graduate Studies Committee, Spring 2006–present
- Applied Mathematics Department Search Committee, Fall 2004–Spring 2006

Miscellaneous

- Camras Weekend Interviews and Applied Mathematics Department Open Houses, Fall 2004, Spring 2005, Fall 2005, Spring 2006, Summer 2007
- Graduate Open Houses, Fall 2006–present
- Minority Recruitment Weekend, Undergraduate Preview Weekend Information Sessions
- Campus Judicial Board, Spring 2006–present
- Judge for Applied Mathematics and IIT posters, Spring 2007
- Attended a meeting called by the President on revising IIT's "Mission, Vision, & Values"
- Ask a Professor Night (2)
- Spoke at IFS of Villa Park, IL (private high school)

GRANT ACTIVITY

Omitted from on-line version.