Daniel W. Cranston

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Department of Mathematics and Applied Mathematics
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Research Interests

Graph theory, combinatorics, and algorithm design; in particular, structural and extremal graph theory, topological graph theory, and graph coloring.

Education

1999–2007 **University of Illinois at Urbana-Champaign**:
Ph.D. in Computer Science, May 2007. Advisor: Douglas West.
Thesis: Coloring and Labeling Problems on Graphs.

M.S. in Computer Science, January 2004. Advisor: Jeff Erickson.
M.S. in Applied Mathematics, Optimization and Algorithms, December 2000.

1996–1999 **Greenville College**:
B.A. Major in Mathematics, magna cum laude, May 1999. Honors program.

Employment

2009- **Virginia Commonwealth University**; Assistant Professor of Mathematics (tenure-track).

2007-2009 **Center for Discrete Math and Theoretical Computer Science (DIMACS) and Bell Labs**; Rutgers University and Murray Hill, N.J. Postdoctoral Fellow.

2003 **Argonne National Lab, MCS Division**; Argonne, IL. Summer intern.

1999 **NSA, Director's Summer Program**; Fort Meade, MD. Cryptologic Mathematician.

Awards and Honors

2013 Nominated for VCU Humanities and Sciences Excellence in Scholarship Award (one nomination per department)
2013 Nominated by department for Blavatnik Award (one nomination per department)
2013 Included in AcademicKeys Who's Who in Sciences Higher Education (WWSHE)
2012 Nominated (1 of 2) for secretary of SIAM Activity Group on Discrete Mathematics
2009–2010 AMS Project NExT Fellow
2002–2003 University of Illinois Computer Science Departmental Fellowship
Spr. 2000 University of Illinois Math Departmental Fellowship program
1998 Clair Carey Mathematics Scholarship (1 student per year)

Grant Activity

Oct. 2013 *Strengthening Brooks' Theorem: Improved upper bounds on the chromatic number of a graph*, NSA Young Investigator's Award (pending)

Publications

H-index 6 and more than 80 citations in MathSciNet as of April 2014. This publication list is current as of 22 April 2014. An updated publication list and copies of these papers can be downloaded from http://www.people.vcu.edu/~dcranston/pubs/.

Refereed Journal Publications

[1] Daniel W. Cranston, Rok Erman, and Riste Škrekovski. *Choosability of the square of a planar graph with maximum degree four.* Australasian Journal of Combinatorics. Vol. 59(1), June 2014, pp. 86–97.

[2] Daniel W. Cranston and Riste Škrekovski. *Sufficient sparseness conditions for G^2 to be $(\Delta+1)$-choosable when $\Delta \geq 5$.* Discrete Applied Math. Vol. 162(10), January 2014, pp. 167–176.

[3] Daniel W. Cranston and Candace M. Kent. *On the Boundedness of Positive Solutions of the Difference Equation $x_n = \max\left\{\frac{A^1_{n-1}}{x_{n-1}}, \frac{A^2_{n-1}}{x_{n-2}}, \ldots, \frac{A^t_{n-1}}{x_{n-t}}\right\}$ with Periodic Parameters.* Applied Mathematics and Computation. Vol. 221, 2013, pp. 144–151.

[4] Daniel W. Cranston and Suil O. *Hamiltonicity in Connected Regular Graphs.* Information Processing Letters Vol. 113, 2013, pp. 858–860.

[5] Daniel W. Cranston, Sogol Jahanbekam, and Douglas B. West. *1,2,3-Conjecture and 1,2-Conjecture for Sparse Graphs.* Discussiones Mathematicae Graph Theory. To appear.

[6] Daniel W. Cranston, Jaehoon Kim, and William B. Kinnersley. *New Results in t-tone Coloring.* Electronic Journal of Combinatorics. Vol. 20(2), 2013, #P17.

[7] Daniel W. Cranston and Landon Rabern. *Coloring claw-free graphs with $\Delta - 1$ colors.* SIAM Journal of Discrete Math. Vol. 27(1), 2013, pp. 534–549.

[8] Daniel W. Cranston, William B. Kinnersley, Suil O, and Douglas B. West. *Game matching number of graphs.* Discrete Applied Math. Vol. 161(13–14), 2013, pp. 1828–1836.

[9] Daniel W. Cranston, William B. Kinnersley, Kevin G. Milans, Gregory J. Puleo, and Douglas B. West. *Chain-making Games in Grid-like Posets.* Journal of Combinatorics. Vol. 3(4), 2012, pp. 633–650.

[10] Jane Butterfield, Daniel W. Cranston, Gregory J. Puleo, Douglas B. West, and Reza Zamani. *Revolutionaries and spies: Spy-good and spy-bad graphs.* Theoret. Comput. Sci. Vol. 463, 2012, pp. 35–53.

[11] Daniel W. Cranston, Anja Pruchnewski, Zsolt Tuza, and Margit Voigt. *List-colorings of K_5-minor-free Graphs with Special List Assignments.* J. of Graph Theory. Vol. 71(1), September 2012, pp. 18–30.

[12] Daniel W. Cranston, Clifford Smyth, and Douglas B. West. *Revolutionaries and Spies on Trees and Unicyclic Graphs.* Journal of Combinatorics. Vol. 3(2), 2012, pp. 195–206.

[13] Daniel W. Cranston, Nitish Korula, Tim LeSaulnier, Kevin Milans, Chris Stocker, Jennifer Vandenbussche, and Douglas B. West. *Overlap Number of Graphs.* Journal of Graph Theory. Vol. 70(1), May 2012, pp. 10–28.

[14] Daniel W. Cranston and Gexin Yu. *Linear Choosability of Sparse Graphs.* Discrete Math. Vol. 311, no. 17, 6 September 2011, pp. 1910–1917.

[15] Daniel W. Cranston, Seog-Jin Kim, and Gexin Yu. *Injective Colorings of Graphs with Low Average Degree.* Algorithmica. Vol. 60(3), July 2011, pp. 553–568.

[16] Daniel W. Cranston, Seog-Jin Kim, and Gexin Yu. *Injective Colorings of Sparse Graphs.* Discrete Math. Vol. 310, no. 21, 6 November 2010, pp. 2965–2973.

[17] Yuehua Bu, Daniel W. Cranston, Mickaël Montassier, André Raspaud, and Weifan Wang. *Star Coloring of Sparse Graphs.* Journal of Graph Theory. Vol. 62(3), November 2009, pp. 201–219.

[18] Daniel W. Cranston and Gexin Yu. *A New Lower Bound on the Density of Vertex Identifying Codes for the Infinite Hexagonal Grid.* Electronic Journal of Combinatorics. Vol. 16(1), 2009, #R113.

[19] Daniel W. Cranston. *Multigraphs with $\Delta \geq 3$ are Totally-$(2\Delta-1)$-Choosable.* Graphs and Combinatorics. Vol. 25(1), May 2009, pp. 35–40.

[20] Daniel W. Cranston. *Edge-choosability and Total-choosability of Planar Graphs with no Adjacent 3-cycles.* Discussiones Mathematicae Graph Theory. Vol. 29(1), 2009, pp. 163–178.

[21] Daniel W. Cranston and Douglas B. West. *Classes of 3-regular graphs that are (7,2)-edge-choosable.* SIAM Journal of Discrete Math. Vol. 23(2), April 2009, pp. 872–881.

[22] Charles Mullins and Daniel W. Cranston. *Research at ASMSA Based on the DIMACS Biomath Program.* DIMACS Series in Discrete Math and Theoretical Computer Science. Vol. 76, pp. 221–226.

[23] Michael O. Albertson, Daniel W. Cranston, and Jacob Fox. *Crossings, Colorings, and Cliques.* Electronic Journal of Combinatorics. Vol. 16(1), 2009, #R45.

[24] Daniel W. Cranston. *Regular Bipartite Graphs are Antimagic.* J. of Graph Theory. Vol. 60, March 2009, pp. 173–182. **Among 10 "most cited" recent JGT publications (as of August 2011)**

[25] Wenjie He, Lingmin Zhang, Daniel Cranston, Yufa Shen, Guoping Zheng. *Choice Number of Complete Multipartite Graphs* $K_{4,3*2,2*(k-6),1*3}$ *and* $K_{3*3,2*(k-5),1*2}$. Discrete Math. Vol. 308, no. 23, 6 December 2008, pp. 5871–5877.

[26] Daniel W. Cranston. *Nomadic Decompositions of Complete Bidirected Graphs.* Discrete Math. Vol. 308, no. 17, 6 September 2008, pp. 3982–3985.

[27] David P. Bunde, Erin W. Chambers, Daniel W. Cranston, Kevin Milans, and Douglas B. West. *Pebbling and Optimal Pebbling in Graphs.* Journal of Graph Theory. Vol. 57, March 2008, pp. 215–238.

[28] Daniel W. Cranston and Seog-Jin Kim. *List-coloring the Square of a Subcubic Graph.* Journal of Graph Theory. Vol. 57, January 2008, pp. 65–87.

[29] Daniel W. Cranston, I. Hal Sudborough, and Douglas B. West. *Bounds for Cut-and-Paste Sorting of Permutations.* Discrete Math. Vol. 307, no. 22, 28 October 2007, pp. 2866–2870.

[30] Daniel W. Cranston. *Strong Edge-coloring of Graphs with Maximum Degree 4 using 22 Colors.* Discrete Math. Vol. 306, no. 21, 6 November 2006, pp. 2772–2778.

Papers Submitted for Publication

[31] Daniel W. Cranston and Douglas B. West. *A Guide to the Discharging Method.*

[32] Daniel W. Cranston, Yuchang Liang, and Xuding Zhu. *Regular Graphs of Odd Degree are Antimagic.*

[33] Daniel W. Cranston and Landon Rabern. *Graphs with* $\chi = \Delta$ *have Big Cliques.*

[34] Daniel W. Cranston and Landon Rabern. *Coloring a graph with* $\Delta - 1$ *colors: Conjectures Equivalent to the Borodin-Kostochka Conjecture that Appear Weaker.*

[35] Daniel W. Cranston and Landon Rabern. *Painting Squares in* $\Delta^2 - 1$ *Shades.*

[36] Daniel W. Cranston and Landon Rabern. *Brooks' Theorem and Beyond.*

Papers in Preparation

[37] Daniel W. Cranston and Landon Rabern. *Fixer-Breaker and short Tashkinov trees.*

[38] Daniel W. Cranston and Landon Rabern. *A list coloring analogue of the Borodin–Kostochka Conjecture for claw-free graphs:* $\chi_\ell(G) \leq \max(\Delta - 1, \omega)$.

Teaching Experience (at VCU unless noted)

Spr. 2014	Graph Coloring, Multivariable Calculus, Research Seminar
Fall 2013	Network Models and Graph Theory, Multivariable Calculus
Fall 2012	Linear Algebra, Calculus I (two sections)
Spr. 2012	Linear Algebra, Mathematical Expositions, Graph Theory II (co-taught)
Fall 2011	Linear Algebra, Mathematical Expositions
Spr. 2011	Graph Theory II, Mathematical Expositions
Fall 2010	Linear Algebra, Math Expositions, Graph Theory (co-taught), Problem Seminar (co-taught)
Spr. 2010	Linear Algebra, Discrete Mathematics
Fall 2009	Linear Algebra, Modern Mathematics, Graph Theory (co-taught)
Spr. 2008	Elementary Combinatorics and Probability (Rutgers)
Fall 2000	Calculus I (UIUC)
Fall 1999	Finite Mathematics (UIUC)

Talks

more than 110 talks in 6 countries, including 4 Canadian provinces and 27 United States

Colloquium Presentations

Mar. 2013 Undergrad Math Club. Wesleyan U.
Feb. 2013 Math Department Colloquium. Howard U.
Mar. 2012 Math Department Colloquium. William & Mary.
Oct. 2011 Student Colloquium Series. Louisiana State U.
Oct. 2011 Student Colloquium Series. Louisiana State U.
Mar. 2011 Math Coffee. Davidson College.
Apr. 2010 Colloquium. US Naval Academy.
Apr. 2009 Math Department Colloquium. William & Mary.
Apr. 2008 CS Colloquium. Rutgers, Camden.

Selected Invited Conference and Seminar Presentations

Jun. 2014 West Fest (honoring 60^{th} birthday of Douglas West). Minneapolis, Minnesota.
Jun. 2014 Graph Coloring Special Session. SIAM Disc. Math 2014. Minneapolis, Minnesota.
Apr. 2014 Discrete Math Seminar. Arizona State U.
Mar. 2014 AMS Sectional Meeting (Special Session in Difference Equations). U of Maryland, Baltimore.
Mar. 2014 AMS Sectional Meeting. U of Tennessee, Knoxville.
Jan. 2014 AMS Special Session in Graph Theory (Co-organizer). Joint Meetings. Baltimore, Maryland.
Jan. 2014 AMS Special Session in Difference Equations. Joint Meetings. Baltimore, Maryland.
Oct. 2013 Discrete Math Days of the Northeast. Wesleyan U.
Sep. 2013 Discrete Applied Math Seminar. Illinois Institute of Technology.
Sep. 2013 Applied and Computational Math Seminar. George Mason.
Apr. 2013 AMS Sectional Meeting. Iowa St.
Apr. 2013 East China Normal University. Shanghai, China.
Apr. 2013 Zhejiang Normal University. Jinhua, China. (2 talks)
Mar. 2013 Applied and Computational Math. Division Seminar. National Inst. of Standards and Tech.
Feb. 2013 Discrete Math Seminar. U of Delaware.
Feb. 2013 Combinatorics, Algebra, & Geometry Seminar. George Mason U.
Jan. 2013 Discrete Math Seminar. West Virginia U.
Jan. 2013 Graph Theory Seminar. Illinois.
Jun. 2012 Graph Coloring Special Session (Organizer). SIAM Disc. Math 2012. Halifax, Nova Scotia.
Feb. 2012 Atlanta Lecture Series in Combinatorics V. Emory.
Oct. 2011 26^{th} Mini-conference on Discrete Math and Algorithms. Clemson.
Oct. 2011 Combinatorics Seminar. Louisiana State U.
Sep. 2011 AMS Sectional Meeting. Wake Forest.
Sep. 2011 Combinatorics Seminar. U of South Carolina.
Aug. 2011 Crossing Numbers Workshop. BIRS, Banff, Alberta.
Apr. 2011 Combinatorics, Algebra, & Geometry Seminar. George Mason U.
Mar. 2011 Special Session on Graph Theory. SIAM Sectional Conference. UNC-Charlotte.
Nov. 2010 Combinatorics Seminar. George Washington U.
July 2010 Seminar. West Virginia U.
July 2010 Research Experience for Graduate Students (REGS). Illinois.
May 2010 Minisymposium on Graph Theory. AMS Sectional Meeting. New Jersey Institute of Tech.

Apr. 2010	Discrete Math Seminar. U of Delaware.
Jan. 2010	SIAM Minisymposium on Graph Theory. Joint Meetings. San Francisco, California.
Jan. 2010	AMS Special Session. Joint Meetings. San Francisco, California.
Aug. 2009	Discrete Math Session. MathFest. Portland, Oregon.
July 2009	SIAM Annual Meeting. Denver, Colorado.
May 2009	Graph Crossing Session. CanaDAM. U of Montreal.
Apr. 2009	Combinatorics Seminar. Lafayette College.
Mar. 2009	Minisymposium on Graph Theory. AMS Sectional Meeting. Illinois.
Jan. 2009	SIAM Minisymposium on Graph Theory, I. Joint Meetings, Washington, D.C.
Oct. 2008	Discrete Math Seminar. Columbia U.
June 2008	Minisymposium on Graph Coloring. SIAM Disc. Math. U of Vermont, Burlington.
May 2008	2008 SIAM Optimization: Minisymposium on Graph Coloring for Computation of Sparse Jacobians and Hessians. Boston, Massachusetts.
Mar. 2008	Discrete Math Seminar. Princeton.
Feb. 2008	Combinatorics Seminar. CUNY.
Nov. 2007	Workshop on Algorithms, Combinatorics, and Geometry. U of North Texas.
Oct. 2007	AMS Regional Meeting. Depaul U.
Mar. 2007	Discrete Math Seminar. Iowa State U.
Oct. 2006	Graph Theory Seminar. Georgia Tech.
Mar. 2006	DiscMath Seminar. Illinois State.

Professional Service

- Refereed more than 70 articles for: *American Mathematical Monthly*, *Applied Math Letters*, *Ars Combinatoria*, *Ars Mathematica Contemporanea*, *Central European Journal of Mathematics*, *Combinatorics, Probability & Computing*, *Discrete Applied Mathematics*, *Discrete Mathematics*, *Discrete Mathematics, Algorithms, and Applications*, *Discussiones Mathematicae Graph Theory*, *Electronic Journal of Combinatorics*, *Eurpoean Journal of Combinatorics*, *Graph Theory Notes of New York*, *Graphs and Combinatorics*, *Information Processing Letters*, *Information Sciences*, *Journal of Combinatorial Math and Combinatorial Computing*, *Journal of Combinatorial Theory B*, *Journal of Graph Theory*, *SIAM Journal on Discrete Math*, and *Utilitas Mathematica*
- Reviewed 9 articles for Math Reviews
- Masters students: Coleman Hall, May 2011; Bobby Jaeger, expected May 2015
- External Reviewer for Ph.D. Dissertation: Landon Rabern, Arizona State, April 2013.
- Co-organize VCU Discrete Math Seminar. 2010–present.
- Co-organized Special Session on Graph Theory, Joint Math Meetings, Baltimore, MD. Jan 2014.
- Organized Special Session on Graph Coloring at SIAM Discrete Math in Halifax, Nova Scotia. June 2012.
- Co-organized Graph Theory Special Session at AMS Sectional Meeting in Washington, D.C. Mar. 2012.
- Co-organized Graph Theory Special Session at AMS Sectional Meeting in Richmond, VA. Nov. 2010.
- Co-organized Project NExT panel on "Supervising senior research/capstone projects". Mathfest 2010.
- Volunteered 6 hours consulting for Carle Clinic on scheduling problems. December 2010.
- Mentored or co-mentored 6 undergraduate students at the Rutgers REU. Summer 2008.
- Teaching Assistant for *Math Days* summer math camp for high school students. June 2006.
- Taught mini-course *Mathematical Games* at University High School during Agora Days 2006.
- Coach of math team at University High School. January 2004 to May 2005.
- Teaching Assistant for *SIMUW* math camp for high school students. Summer 2004.

Professional Memberships

AMS SIAM