

Daniel W. Cranston

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Department of Mathematics and Applied Mathematics
Virginia Commonwealth University
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Research Interests

Graph theory, combinatorics, and algorithm design; in particular, structural and extremal 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 Mathematics, 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.

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.

Publications

This publication list is current as of 11 October 2011. 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. *Strong Edge-coloring of Graphs with Maximum Degree 4 using 22 Colors*. Discrete Math. Vol. 306, no. 21, 6 November 2006, pp. 2772–2778.
- [2] 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.
- [3] 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.
- [4] 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.
- [5] Daniel W. Cranston. *Nomadic Decompositions of Complete Bidirected Graphs*. Discrete Math. Vol. 308, no. 17, 6 September 2008, pp. 3982–3985.

- [6] 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.
- [7] Daniel W. Cranston. *Regular Bipartite Graphs are Antimagic*. Journal of Graph Theory. Vol. 60, March 2009, pp. 173–182.
- Among 10 “most cited” recent JGT publications (as of August 2011) on JGT website**
- [8] Charles Mullins and Daniel W. Cranston. *Research at ASMSA Based on the DIMACS Biomath Program*. DIMACS Series in Discrete Mathematics and Theoretical Computer Science. Vol. 76, pp. 221–226.
- [9] Daniel W. Cranston. *Edge-choosability and Total-choosability of Planar Graphs with no Adjacent 3-cycles*. Discussiones Mathematicae Graph Theory. Vol. 29(1), pp. 163–178.
- [10] 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.
- [11] 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.
- [12] 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.
- [13] Michael O. Albertson, Daniel W. Cranston, and Jacob Fox. *Crossings, Colorings, and Cliques*. Electronic Journal of Combinatorics. Vol. 16(1), #R45.
- [14] Daniel W. Cranston and Gexin Yu. *A Lower Bound on the Density of Vertex Identifying Codes for the Infinite Hexagonal Grid*. Electronic Journal of Combinatorics. Vol. 16(1), #R113.
- [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] Daniel W. Cranston, Nitish Korula, Tim LeSaulnier, Kevin Milans, Chris Stocker, Jennifer Vandenburg, and Douglas B. West. *Overlap Number and Pure Overlap Number*. Journal of Graph Theory. To appear.
- [18] Daniel W. Cranston and Gexin Yu. *Linear List-colorings of Sparse Graphs*. Discrete Math. Vol. 311, no. 17, 6 September 2011, pp. 1910–1917.
- [19] Daniel W. Cranston, Anja Pruchnewski, Zsolt Tuza, and Margit Voigt. *List-colorings of K_5 -minor-free Graphs with Special List Assignments*. Journal of Graph Theory. To appear.

Papers Submitted for Publication

- [20] Daniel W. Cranston and Paul Hovland. *Colorings for Efficient Derivative Computation on Grids with Periodic Boundaries*.
- [21] Daniel W. Cranston, William B. Kinnersley, Kevin G. Milans, Gregory J. Puleo, Douglas B. West. *Chain-making Games in Grid-like Posets*.
- [22] Daniel W. Cranston, Jaehoon Kim, William B. Kinnersley. *New Results in t -tone Coloring of Graphs*.
- [23] Daniel W. Cranston, Clifford Smyth, Douglas B. West. *Revolutionaries and Spies on Trees and Unicyclic Graphs*.
- [24] Jane Butterfield, Daniel W. Cranston, Gregory J. Puleo, Douglas B. West, Reza Zamani. *Revolutionaries and Spies on Graphs*.

Papers in Preparation

- [25] Daniel W. Cranston. *The Discharging Method: A How-to Guide for Coloring Sparse Graphs*.
- [26] Daniel W. Cranston, Luke Postle, and Carl Yegerer. *Modified Linear Programming Weighting for Graph Pebbling*.

Teaching Experience (at VCU unless noted)

Fall 2011	Linear Algebra, Mathematical Expositions
Spr. 2011	Graph Theory II, Mathematical Expositions
Fall 2010	Linear Algebra, Mathematical Expositions, Graph Theory (co-taught), Problem Solving 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)
Various	Mentored 4 VCU students for research seminars and 3 for independent studies

Colloquium Presentations

Oct. 2011	<i>A Proof of Bertrand's Postulate</i> . Student Colloquium Series. Louisiana State U.
Oct. 2011	<i>Moore Graphs: Beauty is Rare</i> . Student Colloquium Series. Louisiana State U.
Mar. 2011	<i>A Proof of Bertrand's Postulate</i> . Math Coffee. Davidson College.
Apr. 2010	<i>Reducibility and Discharging: An Introduction by Example</i> . Colloquium. US Naval Academy.
Apr. 2009	<i>Coloring and List-coloring of Graphs</i> . Math Department Colloquium. William & Mary.
Apr. 2008	<i>Discharging and Reducibility: Introduction by Example</i> . CS Colloquium. Rutgers, Camden.

Invited Conference and Seminar Presentations

Oct. 2011	<i>Revolutionaries and Spies</i> . Combinatorics Seminar. Louisiana State U.
Sep. 2011	<i>Linear List-coloring of Sparse Graphs</i> . AMS Sectional Meeting. Wake Forest.
Sep. 2011	<i>List-coloring K_5-minor-free Graphs</i> . Combinatorics Seminar. U of South Carolina.
Aug. 2011	<i>Crossings, Colorings, and Cliques</i> . Crossing Numbers Workshop. BIRS, Banff, Alberta.
June 2011	<i>Graph Ramsey Theory</i> . Research Experience for Graduate Students (REGS). U of Illinois.
Apr. 2011	<i>Spies and Revolutionaries</i> . Combinatorics, Algebra, & Geometry Seminar. George Mason U.
Mar. 2011	<i>Spies and Revolutionaries</i> . Special Session on Graph Theory. SIAM Sectional Conference. UNC-Charlotte.
Nov. 2010	<i>List-coloring K_5-minor-free Graphs</i> . Combinatorics Seminar. George Washington University.
July 2010	<i>Maker-Breaker Games: Building a Large Chain in a Poset</i> . Seminar. West Virginia U.
July 2010	<i>Maker-Breaker Games: Building a Large Chain in a Poset</i> . Research Experience for Graduate Students (REGS) Seminar. U of IL at Urbana-Champaign.
May 2010	<i>List-colorings of K_5-minor-free Graphs with Special List Assignments</i> . Minisymposium on Graph Theory. AMS Sectional Meeting. New Jersey Institute of Tech.
Apr. 2010	<i>Vertex Identifying Codes</i> . Discrete Math Seminar. University of Delaware.
Jan. 2010	<i>Maker-Breaker Games: Building a Large Chain in a Poset</i> . SIAM Minisymposium on Graph Theory. Joint Meetings. San Francisco, California.
Jan. 2010	<i>Vertex Identifying Codes</i> . AMS Special Session. Joint Meetings. San Francisco, California.
Aug. 2009	<i>Sorting by Cut-and-Paste Moves</i> . Discrete Math Session. MathFest. Portland, Oregon.
July 2009	<i>Injective Colorings of Sparse Graphs</i> . SIAM Annual Meeting. Denver, Colorado.
May 2009	<i>Crossings, Colorings, and Cliques</i> . Graph Crossing Session. CanaDAM. U of Montreal.
Apr. 2009	<i>Crossings, Colorings, and Cliques</i> . Combinatorics Seminar. Lafayette College.
Mar. 2009	<i>Injective Colorings of Sparse Graphs</i> . Minisymposium on Graph Theory. AMS Sectional Meeting. U of IL at Urbana-Champaign.
Feb. 2009	<i>Coloring and List-coloring of Graphs</i> . Seminar. University of Louisville.

- Feb. 2009 *Coloring and List-coloring of Graphs*. Seminar. Duquesne University.
- Feb. 2009 *Coloring and List-coloring of Graphs*. Seminar. Virginia Commonwealth University.
- Jan. 2009 *Entire- $(\Delta + 4)$ -choosability of Plane Graphs with $\Delta \geq 8$* . SIAM Minisymposium on Graph Theory, I. Joint Mathematics Meetings, Washington, D.C.
- Oct. 2008 *Colorings, Crossings, and Cliques*. Discrete Math Seminar. Columbia University.
- June 2008 *(7,2)-edge-choosability of 3-regular Graphs*. Minisymposium on Graph Coloring. SIAM Conference on Discrete Math. University of Vermont, Burlington.
- May 2008 *How to Compute Jacobians More Efficiently*. 2008 SIAM Optimization: Minisymposium on Graph Coloring for Computation of Sparse Jacobians and Hessians. Boston, Massachusetts.
- Mar. 2008 *Discharging and Reducibility: An Introduction by Example*. Math Seminar. Montclair State.
- Mar. 2008 *Star Coloring Planar Graphs with High Girth*. Discrete Math Seminar. Princeton.
- Mar. 2008 *Discharging and Reducibility: Introduction by Example*. Discrete Math Seminar. Delaware.
- Feb. 2008 *Regular Bipartite Graphs are Antimagic*. Combinatorics Seminar. CUNY.
- Nov. 2007 *Discharging and Reducibility: An Introduction by Example*. Workshop on Algorithms, Combinatorics, and Geometry. University of North Texas.
- Oct. 2007 *List-coloring the Square of a Subcubic Graph*. AMS Regional Meeting. Depaul University.
- Mar. 2007 *List-coloring the Square of a Subcubic Graph*. Seminar. DIMACS Center, Rutgers University.
- Mar. 2007 *Coloring and List-coloring of Graphs*. Discrete Math Seminar. Iowa State University.
- Oct. 2006 *List-coloring the Square of a Subcubic Graph*. Graph Theory Seminar. Georgia Tech.
- Oct. 2006 *List-coloring the Square of a Subcubic Graph*. DiscMath Seminar. Illinois State.
- Mar. 2006 *List Edge-colorability of Planar Graphs with no Kites*. DiscMath Seminar. Illinois State.

Contributed Conference Presentations

- May 2011 *Spies and Revolutionaries*. 24th Cumberland Conference. U of Louisville.
- Sep. 2010 *List-coloring K_5 -minor-free Graphs*. Cycles and Colourings. High Tatras, Slovakia.
- June 2010 *List-coloring K_5 -minor-free Graphs*. SIAM Conference on Discrete Math. Austin, Texas.
- May 2010 *List-coloring K_5 -minor-free Graphs*. 23rd Cumberland Conference. U of Mississippi.
- Aug. 2008 *(7,2)-edge-choosability of 3-regular Graphs*. Fete of Comb. and CS. Keszthely, Hungary.
- July 2008 *(7,2)-edge-choosability of 3-regular Graphs*. Midsummer Workshop on Combinatorics. Charles University, Prague, Czech Republic.
- May 2008 *(7,2)-edge-choosability of 3-regular Graphs*. 21st Cumberland Conference. Vanderbilt.
- May 2007 *Regular Bipartite Graphs are Antimagic*. 20th Cumberland Conference. Emory University.
- May 2007 *Regular Bipartite Graphs are Antimagic*. 44th MIGHTY. Wright State University.
- Dec. 2006 *List-coloring the Square of a Subcubic Graph*. Midwest Theory Day. Purdue University.
- Nov. 2006 *List-coloring the Square of a Subcubic Graph*. 43rd MIGHTY. Ind.-Purdue U. at Fort Wayne.
- June 2006 *Edge-choosability of Planar Graphs with no Two Adjacent Triangles*. SIAM Conference on Discrete Mathematics. University of Victoria, British Columbia.
- Apr. 2006 *Edge-choosability of Planar Graphs with no Two Adjacent Triangles*. DIMACS/DIMATIA/Renyi Combinatorial Challenges Meeting. DIMACS, Rutgers.
- Dec. 2005 *Edge-choosability of Planar Graphs without Kites*. Theory Day. U of Wisconsin at Milwaukee.
- May 2005 *Strong Edge-coloring Graphs with $\Delta = 4$ using 22 Colors*. Graph Theory with Altitude (in honor of Joan Hutchinson's 60th Birthday). U of Colorado at Denver.
- May 2005 *Strong Edge-coloring Graphs with $\Delta = 4$ using 22 Colors*. Midwest Theory Day. UIUC.
- Dec. 2004 *Sorting Permutations by Shifts, Flips, and Shift-Flips*. Midwest Theory Day. Depaul.

20 more talks at local seminars

Professional Service

- Refereed more than 50 articles for: *Applied Math Letters*, *Ars Mathematica Contemporanea*, *Ars Combinatoria*, *Discrete Applied Mathematics*, *Discrete Mathematics*, *Discrete Mathematics, Algorithms, and Applications*, *Electronic Journal of Combinatorics*, *European 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 of Discrete Math*, and *Utilitas Mathematica*
- Reviewer for Math Reviews
- Co-organize VCU Discrete Math Seminar. 2010–present.
- Organizing Special Session on Graph Coloring at SIAM Discrete Math in Halifax, Nova Scotia. June 2012.
- Co-organizing 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.
- Masters student: Coleman Hall, May 2011.
- Mentored 4 VCU students for research seminar and 2 for independent study. Fall 2009–Fall 2010.
- Mentored or co-mentored 6 undergraduate students at the Rutgers REU. Summer 2008.
- Fellowships, Assistantships, and Admissions Committee for UIUC CS Department. 2006–2007.
- 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

MAA

SIAM