

# Daniel W. Cranston

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## Research Interests

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

## Academic Appointments

- 2015–present **Virginia Commonwealth University**; Associate Professor of Mathematics (with tenure).  
2016–2017 **Johns Hopkins University**; Visiting Associate Professor of Applied Math and Statistics.  
2009–2015 **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.

## 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.

## Grant Activity

- 2016–2018 *Improved bounds for edge coloring simple graphs: the structure of edge-critical graphs*, NSA Young Investigator Award (\$40,000)  
2015–2017 *Strengthening Brooks' Theorem: Improved upper bounds on the chromatic number of a graph*, NSA Young Investigator Award (\$40,000)

## Awards and Honors

- 2014, 2017 Nominated for VCU Humanities and Sciences Excellence in Scholarship Award (one nomination per department)  
2009–2010 Fellow of AMS Project NExT (Professional Development Program)  
2002–2003 University of Illinois Computer Science Departmental Fellowship  
Spr. 2000 University of Illinois Math Departmental Fellowship  
1998 Clair Carey Mathematics Scholarship (1 student per year)

## Publications

H-index 8 and 174 citations in MathSciNet as of 23 August 2017. Copies of these papers can be downloaded from [https://arxiv.org/a/cranston\\_d\\_1.html](https://arxiv.org/a/cranston_d_1.html) or <http://www.people.vcu.edu/~dcranston/pubs/>.

### Papers Submitted for Publication

- [51] Daniel W. Cranston. *Proper Distinguishing Colorings with Few Colors for Graphs with Girth at Least 5*.
- [50] Daniel W. Cranston. *Acyclic Edge-coloring of Planar Graphs:  $\Delta$  Colors Suffice when  $\Delta$  is Large*.
- [49] Daniel W. Cranston and Landon Rabern. *The Hilton–Zhao Conjecture is True for Graphs with Maximum Degree 4*.
- [48] Marthe Bonamy, Daniel W. Cranston, and Luke Postle. *Planar Graphs of Girth at least Five are Square  $(\Delta + 2)$ -Choosable*.
- [47] Daniel W. Cranston and Landon Rabern. *Planar Graphs are  $9/2$ -colorable*.

### Refereed Journal Publications

- [46] Daniel W. Cranston and Landon Rabern. *Beyond Degree Choosability*. *Electronic Journal of Combinatorics*. Vol. 24(3), 2017, #P3.29.
- [45] Daniel W. Cranston and Landon Rabern. *Short Fans and the  $5/6$  Bound for Line Graphs*. *SIAM Journal on Discrete Math*. To appear.
- [44] Daniel W. Cranston and Landon Rabern. *List-coloring Claw-free Graphs with  $\Delta - 1$  colors*. *SIAM Journal on Discrete Math*. Vol. 31(2), 2017, pp. 726–748.
- [43] Daniel W. Cranston and Landon Rabern. *Edge Lower Bounds for List Critical Graphs, via Discharging*. *Combinatorica*. To appear.
- [42] Daniel W. Cranston and Landon Rabern. *Subcubic Edge Chromatic Critical Graphs have Many Edges*. *Journal of Graph Theory*. To appear. Vol. 86(1), September 2017, pp. 122–136.
- [41] Daniel W. Cranston and Douglas B. West. *An Introduction to the Discharging Method via Graph Coloring*. *Discrete Math*. Vol. 340, no. 4, April 2017, pp. 766–793.  
Extended version: *A Guide to the Discharging Method*. At: <https://arxiv.org/abs/1306.4434v1>
- [40] Daniel W. Cranston and Robert Jaeger. *Coloring Squares of Planar Graphs with no 4-cycles and no 5-cycles*. *Journal of Graph Theory*. Vol. 85(4), August 2017, pp. 721–737.
- [39] Daniel W. Cranston, Luke Postle, Chenxiao Xue, and Carl Yerger. *Modified Linear Programming and Class 0 Bounds for Graph Pebbling*. *J. Combinatorial Optimization*. 34(1), July 2017, pp. 114–132.
- [38] Daniel W. Cranston and Landon Rabern. *Planar Graphs have Independence Ratio at least  $3/13$* . *Electronic Journal of Combinatorics*. Vol. 23(3), 2016, #P3.45.
- [37] Daniel W. Cranston and Landon Rabern. *Painting Squares in  $\Delta^2 - 1$  Shades*. *Electronic Journal of Combinatorics*. Vol. 23(2), 2016, #P2.50.
- [36] Daniel W. Cranston and Landon Rabern. *Graphs with  $\chi = \Delta$  have Big Cliques*. *SIAM Journal on Discrete Math*. Vol. 29(4), 2015, pp. 1792–1814.
- [35] Daniel W. Cranston and Landon Rabern. *The Fractional Chromatic Number of the Plane*. *Combinatorica*. To appear.
- [34] Daniel W. Cranston and Landon Rabern. *A Note on Coloring Vertex-transitive Graphs*. *Electronic Journal of Combinatorics*. Vol. 22(2), 2015, #P2.1.
- [33] Daniel W. Cranston and Landon Rabern. *Brooks’ Theorem and Beyond*. *J. Graph Theory*. Vol. 80(3), November 2015, pp. 199–225.
- [32] Daniel W. Cranston and Landon Rabern. *Coloring a graph with  $\Delta - 1$  colors: Conjectures Equivalent to the Borodin-Kostochka Conjecture that Appear Weaker*. *European J. Comb*. Vol. 44, Part A, February 2015, pp. 23–42.
- [31] Daniel W. Cranston, Yuchang Liang, and Xuding Zhu. *Regular Graphs of Odd Degree are Antimagic*. *Journal of Graph Theory*. Vol. 80(1), September 2015, pp. 28–33.
- [30] 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.

- [29] 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.
- [28] Daniel W. Cranston and Candace M. Kent. *On the Boundedness of Positive Solutions of the Difference Equation  $x_n = \max \left\{ \frac{A_{n-1}^1}{x_{n-1}}, \frac{A_{n-1}^2}{x_{n-2}}, \dots, \frac{A_{n-1}^t}{x_{n-t}} \right\}$  with Periodic Parameters*. Applied Mathematics and Computation. Vol. 221, 2013, pp. 144–151.
- [27] Daniel W. Cranston and Suil O. *Hamiltonicity in Connected Regular Graphs*. Information Processing Letters Vol. 113, 2013, pp. 858–860.
- [26] Daniel W. Cranston, Sogol Jahanbekam, and Douglas B. West. *1,2,3-Conjecture and 1,2-Conjecture for Sparse Graphs*. Discussiones Mathematicae Graph Theory. Vol. 34(4), 2014, pp. 769–799.
- [25] Daniel W. Cranston, Jaehoon Kim, and William B. Kinnersley. *New Results in  $t$ -tone Coloring*. Electronic Journal of Combinatorics. Vol. 20(2), 2013, #P17.
- [24] Daniel W. Cranston and Landon Rabern. *Coloring Claw-free Graphs with  $\Delta - 1$  Colors*. SIAM Journal on Discrete Math. Vol. 27(1), 2013, pp. 534–549.
- [23] 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.
- [22] 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.
- [21] 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.
- [20] 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.
- [19] 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.
- [18] Daniel W. Cranston, Nitish Korula, Tim LeSaulnier, Kevin Milans, Chris Stocker, Jennifer Vandenburg, and Douglas B. West. *Overlap Number of Graphs*. Journal of Graph Theory. Vol. 70(1), May 2012, pp. 10–28.
- [17] Daniel W. Cranston and Gexin Yu. *Linear Choosability of Sparse Graphs*. Discrete Math. Vol. 311, no. 17, 6 September 2011, pp. 1910–1917.
- [16] 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.
- [15] 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.
- [14] 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.
- [13] 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.
- [12] 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] 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.
- [10] Daniel W. Cranston and Douglas B. West. *Classes of 3-regular Graphs that are  $(7,2)$ -edge-choosable*. SIAM Journal on Discrete Math. Vol. 23(2), April 2009, pp. 872–881.
- [9] 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.
- [8] Michael O. Albertson, Daniel W. Cranston, and Jacob Fox. *Crossings, Colorings, and Cliques*. Electronic Journal of Combinatorics. Vol. 16(1), 2009, #R45.
- [7] 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)**
- [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.

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

### Published Problems

- [P1] Daniel W. Cranston and Douglas B. West. *Bulgarian Solitaire*. Problem 11712, Problems Section of American Mathematical Monthly, June–July 2013.

### Talks

over 135 talks in 6 countries, including 4 Canadian provinces and 29 United States

### Colloquium Presentations

- Apr. 2015 *Planar graphs are  $\frac{9}{2}$ -colorable*. Math Department Colloquium. George Mason.
- Mar. 2015 *Planar graphs are  $\frac{9}{2}$ -colorable*. Math Department Colloquium. William & Mary.
- Mar. 2015 *Planar graphs are  $\frac{9}{2}$ -colorable*. Applied Math and Stat. Dept. Seminar. Johns Hopkins.
- Feb. 2015 *Planar graphs are  $\frac{9}{2}$ -colorable*. Math Department Colloquium. George Washington U.
- Mar. 2013 *A Proof of Bertrand’s Postulate*. Undergrad Math Club. Wesleyan U.
- Feb. 2013 *Revolutionaries and Spies*. Math Department Colloquium. Howard U.
- Mar. 2012 *Revolutionaries and Spies*. Math Department Colloquium. William & Mary.
- Oct. 2011 *A Proof of Bertrand’s Postulate*. Student Colloquium Series. Louisiana State U.
- Oct. 2011 *Moore Graphs: Beauty is Rare*. Student Colloquium Series. Louisiana State U.
- Mar. 2011 *A Proof of Bertrand’s Postulate*. Math Coffee. Davidson College.
- Apr. 2010 *Reducibility and Discharging: An Introduction by Example*. Colloquium. US Naval Academy.
- Apr. 2009 *Coloring and List-coloring of Graphs*. Math Department Colloquium. William & Mary.
- Apr. 2008 *Reducibility and Discharging: Introduction by Example*. CS Colloquium. Rutgers, Camden.

### Selected Invited Conference and Seminar Presentations

- May 2017 *Edge-coloring Multigraphs*. 29<sup>th</sup> Cumberland Conference, Vanderbilt. (A principal speaker.)
- Apr. 2017 *List-coloring Claw-free Graphs with  $\Delta - 1$  Colors*. AMS Sectional Meeting. IU, Bloomington.
- Oct. 2016 *Edge-coloring Multigraphs*. Graph Coloring Workshop. BIRS, Banff, Alberta.
- Sep. 2016 *Edge-coloring Multigraphs*. Applied Math and Stat. Dept. Seminar. Johns Hopkins.
- Jun. 2016 Graph Coloring Minisymposium (organizer). *Planar Graphs of Girth at least Five are Square  $(\Delta + 2)$ -Choosable*. SIAM Disc. Math 2016. Atlanta, Georgia.
- Sep. 2015 *Fractional Coloring Planar Graphs and the Plane*. Cycles and Colouring. Slovakia.
- Oct. 2014 *Painting squares with  $\Delta^2 - 1$  colors*. Combinatorics Seminar. U of Rhode Island.
- Oct. 2014 *Boundedness of solutions for max-type reciprocal difference equations*. Difference Equations Seminar. U of Rhode Island.
- Jun. 2014 *Graphs with  $\chi = \Delta$  have big cliques*. West Fest (honoring 60<sup>th</sup> birthday of Douglas West). Minneapolis, Minnesota.

- Jun. 2014 Graph Coloring Special Session. *Painting squares with  $\Delta^2 - 1$  colors*. SIAM Disc. Math 2014. Minneapolis, Minnesota.
- Apr. 2014 *Graphs with  $\chi = \Delta$  have big cliques*. Discrete Math Seminar. Arizona State U.
- Mar. 2014 *Boundedness of Solutions to Reciprocal Max-Type Difference Equations*. AMS Sectional Meeting (Special Session in Difference Equations). U of Maryland, Baltimore.
- Jan. 2014 *Boundedness of Solutions to Reciprocal Max-Type Difference Equations*. AMS Special Session in Difference Equations. Joint Meetings. Baltimore, Maryland.
- Oct. 2013 *Graphs with  $\chi = \Delta$  have big cliques*. Discrete Math Days of the Northeast. Wesleyan U.
- Sep. 2013 *Graphs with  $\chi = \Delta$  have big cliques*. Discrete Applied Math Seminar. IL Institute of Tech.
- Sep. 2013 *Boundedness of solutions for max-type reciprocal difference equations*. Applied and Computational Math Seminar. George Mason.
- Apr. 2013 *Coloring claw-free graphs with  $\Delta - 1$  colors*. AMS Sectional Meeting. Iowa St.
- Apr. 2013 *Coloring claw-free graphs with  $\Delta - 1$  colors*. East China Normal University. Shanghai, China.
- Apr. 2013 *Star coloring sparse graphs*. Zhejiang Normal University. Jinhua, China. (2 talks)
- Mar. 2013 *Revolutionaries and Spies on Graphs*. Applied and Computational Math. Division Seminar. National Inst. of Standards and Tech.
- Feb. 2013 *Coloring claw-free graphs with  $\Delta - 1$  colors*. Discrete Math Seminar. U of Delaware.
- Feb. 2013 *Coloring claw-free graphs with  $\Delta - 1$  colors*. Combinatorics, Algebra, & Geometry Seminar. George Mason U.
- Jan. 2013 *Coloring claw-free graphs with  $\Delta - 1$  colors*. Graph Theory Seminar. Illinois.
- Jun. 2012 *Conjectures Equivalent to the Borodin-Kostochka Conjecture that seem Weaker*. Graph Coloring Special Session (Organizer). SIAM Disc. Math 2012. Halifax, Nova Scotia.
- Feb. 2012 *Overlap Number of Graphs*. Atlanta Lecture Series in Combinatorics V. Emory.
- Oct. 2011 *Revolutionaries and Spies*. 26<sup>th</sup> Mini-conference on Discrete Math and Algorithms. Clemson.
- Oct. 2011 *Revolutionaries and Spies*. Combinatorics Seminar. Louisiana State U.
- Sep. 2011 *Linear List-coloring of Sparse Graphs*. AMS Sectional Meeting. Wake Forest.
- Sep. 2011 *List-coloring  $K_5$ -minor-free Graphs*. Combinatorics Seminar. U of South Carolina.
- Aug. 2011 *Crossings, Colorings, and Cliques*. Crossing Numbers Workshop. BIRS, Banff, Alberta.
- Mar. 2011 *Spies and Revolutionaries*. Special Session on Graph Theory. SIAM Sectional Conference. UNC-Charlotte.
- May 2010 *List Colorings of  $K_5$ -minor-free Graphs with Special List Assignments*. Minisymposium on Graph Theory. AMS Sectional Meeting. New Jersey Institute of Tech.
- Jan. 2010 *Maker-Breaker Games: Building a Large Chain in a Poset*. SIAM Minisymposium on Graph Theory. Joint Meetings. San Francisco, California.
- Jan. 2010 *Vertex Identifying Codes*. AMS Special Session. Joint Meetings. San Francisco, California.
- Aug. 2009 *Sorting by Cut-and-Paste Moves*. Discrete Math Session. MathFest. Portland, Oregon.
- July 2009 *Injective Colorings of Sparse Graphs*. SIAM Annual Meeting. Denver, Colorado.
- May 2009 *Crossings, Colorings, and Cliques*. Graph Crossing Session. CanaDAM. U of Montreal.
- Apr. 2009 *Crossings, Colorings, and Cliques*. Combinatorics Seminar. Lafayette College.
- Mar. 2009 *Injective Colorings of Sparse Graphs*. Minisymposium on Graph Theory. AMS Sectional Meeting. Illinois.
- Jan. 2009 *Entire- $(\Delta + 4)$ -choosability of Plane Graphs with  $\Delta \geq 8$* . SIAM Minisymposium on Graph Theory, I. Joint Meetings, Washington, D.C.
- Oct. 2008 *Colorings, Crossings, and Cliques*. Discrete Math Seminar. Columbia U.
- June 2008  *$(7,2)$ -edge-choosability of 3-regular Graphs*. Minisymposium on Graph Coloring. SIAM Disc. Math. U of Vermont, Burlington.
- 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.

## Teaching Experience (at VCU unless noted)

<i>Spr. 2016</i>	Graph Theory II, Multivariable Calculus
<i>Fall 2015</i>	Linear Algebra (two sections)
<i>Spr. 2015</i>	Combinatorics, Multivariable Calculus, Research Seminar
<i>Fall 2014</i>	Numerical Analysis I, Multivariable Calculus
<i>Spr. 2014</i>	Graph Coloring, Multivariable Calculus, Research Seminar
<i>Fall 2013</i>	Network Models and Graph Theory, Multivariable Calculus
<i>Fall 2012</i>	Linear Algebra, Calculus I (two sections)
<i>Spr. 2012</i>	Linear Algebra, Mathematical Expositions, Graph Theory II (co-taught)
<i>Fall 2011</i>	Linear Algebra, Mathematical Expositions
<i>Spr. 2011</i>	Graph Theory II, Mathematical Expositions
<i>Fall 2010</i>	Linear Algebra, Math Expositions, Graph Theory (co-taught), Problem Seminar (co-taught)
<i>Spr. 2010</i>	Linear Algebra, Discrete Mathematics
<i>Fall 2009</i>	Linear Algebra, Modern Mathematics, Graph Theory (co-taught)
<i>Spr. 2008</i>	Elementary Combinatorics and Probability (Rutgers)
<i>Fall 2000</i>	Calculus I (UIUC)
<i>Fall 1999</i>	Finite Mathematics (UIUC)
<i>Various</i>	Mentored 7 VCU students for research seminar and 4 for independent studies

## Professional Service

- Refereed over 85 articles for: *American Mathematical Monthly*, *Australasian Journal of Combinatorics*, *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*, *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 Optimization*, *Journal of Combinatorial Theory B*, *Journal of Combinatorics*, *Journal of Graph Theory*, *SIAM Journal on Discrete Math*, *Theory and Applications of Graphs*, *Utilitas Mathematica*, and a book.
- Reviewed conference articles for: STOC 2014, WG 2014, EuroComb 2015
- Reviewed 14 articles for Math Reviews
- Reviewed 3 grant proposals for NSA
- NSF Panel Reviewer, 2015.
- Masters students: Bobby Jaeger, May 2015; Coleman Hall, May 2011.
- External Reviewer for Ph.D. Dissertation: Landon Rabern, Arizona State, April 2013.
- Co-organize VCU Discrete Math Seminar. 2010–present.
- Organized Special Session on Graph Coloring at SIAM Discrete Math in Atlanta, Georgia. June 2016.
- 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.
- Volunteered 14 hours as teaching assistant for *Kids on Campus*. June 2014.
- 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.