

CURRICULUM VITAE
for
Alissa Susan Crans

PROFESSIONAL ADDRESS

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EDUCATION

- Ph.D. in Mathematics, University of California, Riverside, August 2004
Dissertation Advisor: John C. Baez
Dissertation Topic: *Lie 2-Algebras*
- M.S. in Mathematics, University of California, Riverside, June 2000
- B.S. in Mathematics, Summa cum Laude, Honors in Mathematics, Phi Beta Kappa,
University of Redlands, May 1999

CURRENT POSITIONS

- Associate Professor, Loyola Marymount University, August 2011 – present
- Associate Director of Project NExT, Mathematical Association of America, August 2014 – present

PREVIOUS POSITIONS

- Associate Director of Diversity and Education, Mathematical Sciences Research Institute, August 2012 – August 2014
- National Security Agency Sabbaticant, September 2011 – March 2012
- Assistant Professor, Loyola Marymount University, August 2004 – July 2011
- Visiting Dickson Instructor, University of Chicago, January – August 2008
- VIGRE Ross Assistant Professor, The Ohio State University, September 2005 – August 2006
- Lecturer in Mathematics, Pomona College, Spring 2002
- Teaching Associate in Mathematics, University of California, Riverside,
Summers 2001 – 2004
- Adjunct Instructor, University of California, Riverside, Fall 2000 and Fall 2001
- Graduate Teaching Assistant, University of California, Riverside,
Fall 2000 – Spring 2002 and Fall 2003 – Spring 2004

PUBLICATIONS

Accepted/Appeared

1. Crans, A.; Ganzell, S.; and Mellor, B. “The Forbidden Number of a Knot.” To appear in the *Kyungpook Math Journal*. Also available at <http://arxiv.org/abs/1305.5200>.
2. Crans, A.; Rovetti, R.; and Vega, J. “Solving the *KO Labyrinth*.” *Mathematics Magazine*, Vol. 88 (2015), No. 1: 27 – 36.
3. Crans, A. and Wagemann, F. “Crossed Modules of Racks.” *Homology, Homotopy, and Applications*, Vol. 16 (2014), No. 2: 85 – 106. Also available at <http://arxiv.org/abs/1310.0852>.
4. Crans, A. and Nelson, S. “Hom Quandles.” *Journal of Knot Theory and its Ramifications*. Vol. 23 (2014), No. 2. Also available at <http://arxiv.org/abs/1310.4705>.
5. Crans, A.; Przytycki, J.; and Putyra, K. “Torsion in one-term distributive homology.” *Fundamenta Mathematicae*. Vol. 225 (2014): 75 – 94. Also available at <http://arxiv.org/abs/1306.1506>.
6. Crans, A.; Henrich, A.; and Nelson, S. “Knot and link invariants from the Alexander virtual biquandle.” *Journal of Knot Theory and its Ramifications*, Vol. 22 (2013), No. 4. Also available at <http://www.arxiv.org/abs/1110.1371>.
7. Crans, A.; Nelson, S.; and Sarkar, A. “Enhancements of the rack counting invariant via N-reduced dynamical cocycles.” *New York Journal of Mathematics*, Vol. 18 (2012): 337 – 351. Also available at <http://www.arxiv.org/abs/1108.4387>.
8. Crans, A. and Rovetti, R. “Beyond Formulas: A Collaboration between Liberal Arts Honors Underclassmen and Senior Math Majors.” *Honors in Practice*, Vol. 7 (2011): 115 – 126.
9. Crans, A.; Fiore, T.; and Satyendra, R. “Musical Actions of Dihedral Groups.” *The American Mathematical Monthly*, Vol. 116 (2009), No. 6: 479 – 495. Also available at <http://www.arxiv.org/abs/0711.1873>.
10. Carter, J.S.; Crans, A.; Elhamdadi, M.; Karadayi, E.; and Saito, M. “Cohomology of Frobenius Algebras and the Yang-Baxter Equation.” *Communications in Contemporary Mathematics*, Vol. 10 (2008), No. 1 supp: 791 – 814. Also available at <http://www.arxiv.org/abs/0801.2567>.
11. Carter, J.S.; Crans, A.; Elhamdadi, M.; and Saito, M. “Cohomology of Categorical Self-Distributivity.” *Journal of Homotopy and Related Structures*, Vol. 3 (2008), No. 1: 13 – 63. Also available at <http://www.arxiv.org/abs/math/0607417>.
12. Carter, J.S.; Crans, A.; Elhamdadi, M.; and Saito, M. “Cohomology of the adjoint of Hopf algebras.” *Journal of Generalized Lie Theory and Applications*, Vol. 2 (2008), No. 1: 19 – 34. Also available at <http://www.arxiv.org/abs/0705.3231>.
13. Baez, J.; Crans, A.; and Wise, D. “Exotic Statistics for Loops in 4d BF Theory.” *Advances in Theoretical and Mathematical Physics*, Vol. 11 (2007), No. 11: 707 – 749. Also available at <http://www.arxiv.org/abs/gr-qc/0603085>.
14. Baez, J.; Crans, A.; Schreiber, U.; and Stevenson, D. “From Loop Groups to 2-Groups.” *Homology, Homotopy, and Applications*, Vol. 9 (2007), No. 2: 101 – 135. Also available at <http://arxiv.org/abs/math/0504123>.
15. Baez, J. and Crans, A. “Higher Dimensional Algebra VI: Lie 2-Algebras.” *Theory and Applications of Categories*, Vol. 12 (2004): 492 – 538. Also available at <http://arxiv.org/abs/math/0307263>.
16. Crans, A.; Fallat, S.; and Johnson, C. “The Hadamard Core of the Totally Nonnegative Matrices.” *Linear Algebra and its Applications*, Vol. 328 (2001): 203 – 222.
17. Crans, A.; and Weinhold, R. “What to Do on Your Summer Vacation.” *Math Horizons* February 2001: 23 – 26.

Un-Refereed

18. Crans, A. “Congrats you’re ABD! Now what?” *Newsletter for E-Mentoring Network in Mathematical Sciences*, December 2012.
19. Crans, A., Morgan, F., and Williams, T. “Town Hall Meeting: Minority Participation in Math” *Focus Magazine*, December 2013/January 2014.

RESEARCH ACTIVITY

- Short term visitor of J. Peter May at the University of Chicago, May 2005, April 2006, and May 2007

GRANTS**Research**

1. Crans, A. *Collaboration Grant for Mathematicians*, Simons Foundation, 2015 - 2020, \$35,000
2. Crans, A. *Categorified Racks*, Summer Research Grant, Loyola Marymount University, Summer 2015, \$5,000
3. Crans, A. *2 Quandles: Categorified Quandles*, National Security Agency Young Investigator Grant, Summers 2010 and 2011, \$29,709
4. Crans, A. *Representations of Lie 2-Algebras*, Summer Research Grant, Loyola Marymount University, Summer 2007, \$5,000
5. Crans, A. AWM Travel Grant to attend *Categories in Algebra, Geometry and Mathematical Physics Conference* at Macquarie University, Sydney, July 2005, \$1,257

Conferences

6. Crans, A. (PI); Fogel, K. (co-PI); Killpatrick, K. (co-PI); and Rock, J. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2015*, MAA undergraduate conferences NSF Grant DMS-0846477, Cal Lutheran University, March 2015, \$6,000
7. Crans, A. (co-PI); and Killpatrick, K. (PI) *Pacific Coast Undergraduate Mathematics Conference 2014*, MAA undergraduate conferences NSF Grant DMS-0846477, Pepperdine University, March 2014, \$3,000
8. Crans, A. (co-PI); Frey, S. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conferences 2013*, NSF Mathematical Sciences Infrastructure Program DMS-1301707, Cal Poly Pomona, March 2013, \$19,011
9. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conferences 2012*, NSF Mathematical Sciences Infrastructure Program DMS-1139811, Cal Poly Pomona, March 2012, \$23,056
10. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2012*, MAA undergraduate conferences NSF Grant DMS-0846477, Cal Poly Pomona, March 2012, \$3,500
11. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2011*, MAA undergraduate conferences NSF Grant DMS-0241090, Loyola Marymount University, March 2011, \$3,500
12. Cameron, N. (co-PI); Crans, A. (co-PI); and Killpatrick, K. (PI) *Pacific Coast Undergraduate Mathematics Conference 2011*, National Security Agency Conference/Workshop Grant, Loyola Marymount University, March 2011, \$10,000
13. Cameron, N. (co-PI); Crans, A. (co-PI); and Killpatrick, K. (PI) *Pacific Coast Undergraduate Mathematics Conference 2010*, MAA undergraduate conferences NSF Grant DMS-0241090, Pepperdine University, March 2010, \$3,500

14. Crans, A. (co-PI); DeCoste, R. (PI); and Stewart, S.A. (co-PI) *Career Mentoring Workshop for Women 2009*, MAA TENSOR Grant, Wheaton College, August 2009, \$6,000
15. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2009*, National Security Agency Conference/Workshop Grant, University of California at Riverside, March 2009, \$15,000
16. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2009*, MAA undergraduate conferences NSF Grant DMS-0241090, University of California at Riverside, March 2009, \$2,500
17. Crans, A. (co-PI); DeCoste, R. (PI); and Stewart, S.A. (co-PI) *Career Mentoring Workshop for Women 2008*, MAA TENSOR Grant, Wheaton College, August 2008, \$6,000
18. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2008*, National Security Agency Conference/Workshop Grant, Loyola Marymount University, April 2008, \$14,650
19. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2008*, MAA undergraduate conferences NSF Grant DMS-0241090, Loyola Marymount University, April 2008, \$3,000
20. Cameron, N. (co-PI); Crans, A. (PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2008*, Raytheon Company, Loyola Marymount University, April 2008, \$2,000
21. Crans, A. (co-PI); DeCoste, R. (PI); and Stewart, S.A. (co-PI) *Career Mentoring Workshop for Women 2007*, MAA TENSOR Grant, WestPoint Military Academy, August 2007, \$6,000
22. Cameron, N. (co-PI); Crans, A. (co-PI); and Killpatrick, K. (PI) *Pacific Coast Undergraduate Mathematics Conference 2007*, MAA undergraduate conferences NSF Grant DMS-0241090, Pepperdine University, March 2007, \$3,000
23. Cameron, N. (PI); Crans, A. (co-PI); and Killpatrick, K. (co-PI) *Pacific Coast Undergraduate Mathematics Conference 2006*, MAA undergraduate conferences NSF Grant DMS-0241090, Occidental College, March 2006, \$2,500

Curriculum Development

24. Crans, A. *Math 102: Quantitative Skills for the Modern World with Service Learning*, Faith and Justice Curriculum Development Grant, Loyola Marymount University, Fall 2013, \$5,000

SCHOLARSHIP OF ENGAGEMENT

Conferences Organized

- Crans, A.; Fogel, K.; Killpatrick, K.; and Rock, J. *Pacific Coast Undergraduate Mathematics Conference*, Pepperdine University and Cal Lutheran University, March 2014 and 2015
- Crans, A.; Richardson, P.; and Roche, J. *Graduate Education Mentoring Workshop*, (continuation of Carleton College Summer Mathematics Program), Joint Mathematics Meetings San Antonio, January 2015; Baltimore, January 2014
- Crans, A.; Morgan, F.; and Williams, T. *Town Hall Meeting on Minority Participation in Mathematics*, MathFest 2013, Hartford, CT, August 2013
- Crans, A.; Frey, S.; and Killpatrick, K. *Pacific Coast Undergraduate Mathematics Conference*, Cal Poly Pomona, March 2013
- Crans, A.; Karp, D.; Williams, T.; and Wilson, R. *Aftermath Conference: Preparing for Careers in the Mathematical Sciences*, Harvey Mudd College, February 2013
- Co-organizer of *Women in Mathematics Symposium*, sponsored by the Institute for Pure and Applied Mathematics (IPAM) at the University of California at Los Angeles, February 2011

- Crans, A.; Crowley, K.; and Roche, J. *Graduate Education Mentoring Workshop*, (continuation of Carleton College Summer Mathematics Program), Joint Mathematics Meetings San Diego, January 2013; Boston, January 2012; New Orleans, January 2011; San Francisco, January 2010
- Crans, A.; Haskell, C.; and Radunskaya, A. *Southern California Women in Mathematics Symposium*, University of Southern California, October 2012; Loyola Marymount University, January 2012; Pomona College, November 2010; University of Southern California, February 2010; Loyola Marymount University, March 2009
- Crans, A.; DeCoste, R.; and Stewart, S.A. *Career Mentoring Workshop*, Wheaton College, July 2010, July 2009, and July 2008; and WestPoint Military Academy, August 2007
- Cameron, N.; Crans, A.; and Killpatrick, K. *Pacific Coast Undergraduate Mathematics Conference*, various locations (see grants above), March 2013, March 2012, March 2011, March 2010, March 2009, March 2008, April 2007, and March 2006

HONORS

- Co-Recipient (with K. Killpatrick) of the *Programs that Make a Difference* Award by the American Mathematical Society for the “Pacific Coast Undergraduate Mathematics Conference,” January 2015
- Recipient of the *Henry L. Alder Award* for “Distinguished Teaching by a Beginning College/University Mathematics Faculty Member” by the Mathematical Association of America, August 2011
- Recipient of the *Merten M. Hasse Prize* by the Mathematical Association of America for a “noteworthy expository paper appearing in an Association publication” for “Musical Actions of Dihedral Groups,” August 2011
- Selected speaker in AWM Workshop at Joint Mathematics Meetings, January 2007
- Participant in Intercultural Pedagogy Workshop at Loyola Marymount University 2006 – 2007
- Project NExT Fellow, Mathematical Association of America, 2004 – 2005
- Selected AWM Workshop Poster Presenter at Joint Mathematics Meeting, January 2004
- Chancellor’s Distinguished Fellowship, University of California, Riverside, 1999 – 2004
- Outstanding Teaching Assistant, University of California at Riverside, 2002
- ATHENA of the Inland Valleys Award (for university-public school collaboration in improving mathematics education), May 2000

MAJOR INVITED PRESENTATIONS

- “A Surreptitious Sequence: the Catalan Numbers,” National Math Festival, Washington DC, April 2015
- “Patterns + Women = Figures in Mathematics,” National Math Festival, Washington DC, April 2015
- “Cracking the Cubic: Cardano, Controversy, and Creasing,” *Southeastern Undergraduate Conference for Women in Mathematics*, Plenary Speaker, Clemson University, November 2014
- “A Surreptitious Sequence: the Catalan Numbers,” *MAA Distinguished Lecture Series*, Mathematical Association of America Carriage House, May 2014
- “Patterns + Women = Figures in Mathematics,” *Sonya Kovalevsky Mathematics Day*, Keynote Speaker, California State University, Fresno, November 2013
- “A Surreptitious Sequence: the Catalan Numbers,” *Math Encounters*, Museum of Mathematics, September 2013
- “Musical Mathematics,” *Bay Area Mathematical Adventures* Series, Santa Clara University, November 2012
- “Cracking the Cubic: Cardano, Controversy, and Creasing,” *Mathematical Association of America DC-MD-VA Spring Section Meeting*, Invited Speaker, Stevenson University, April 2012

- “Patterns + Women = Figures in Mathematics,” *Expanding Your Horizons*, Keynote Speaker, James Madison University, March 2012
- “A Survey of Quandle Theory,” *Knots in Washington XXIII Conference*, Plenary Address, George Washington University, December 2011
- “A Surreptitious Sequence: the Catalan Numbers,” *Mathematical Association of America EPaDel Fall Section Meeting*, Invited Speaker, Bryn Mawr College, November 2011
- “Count Me In!,” *MathFest 2011*, Alder Award Presentation, Lexington, August 2011
- “Million Dollar Mathematics,” *Southern California Undergraduate Math Day*, Keynote Speaker, University of California at San Diego, April 2011
- “Pascal’s Patterns,” *University of Oklahoma Math Day*, Keynote Speaker, University of Oklahoma, November 2010
- “Musical Actions of Dihedral Groups,” *Mathematical Association of America So Cal-Nev Spring Section Meeting*, Invited Speaker, Harvey Mudd College, April 2010
- “Quandle Queries,” *Knots in Washington XXIII Conference*, Opening Address, George Washington University, November 2006

INVITED RESEARCH PRESENTATIONS

- “Crossed Modules of Racks,” *Algebra Seminar*, University of Edinburgh, May 2015
- “Crossed Modules of Racks,” *Algebra Seminar*, University of Glasgow, May 2015
- “Just a Game? A Mathematical Analysis of the *KO Labyrinth*,” *Pure and Applied Talks by Women Math Warriors presented by EDGE*, Joint Mathematics Meetings, San Antonio, January 2015
- “Crossed Modules of Racks,” *Topology Seminar*, University of Chicago, May 2014
- “Crossed Modules of Racks,” *AMS Special Session on Algebraic Structures Motivated by Knot Theory*, Joint Mathematics Meetings, Baltimore, January 2014
- “The Forbidden Number,” *Pure and Applied Talks by Women Math Warriors presented by EDGE*, Joint Mathematics Meetings, Baltimore, January 2014
- “Hom Quandles,” *AMS Special Session on Homology Theories Motivated by Knot Theory*, AMS Spring Sectional Meeting, George Washington University, March 2012
- “Torsion in One Term Distributive Homology,” *Knots in Washington XXIV Conference*, George Washington University, March 2012
- “A Survey of Quandle Theory,” *Topology Seminar*, University of Kentucky, February 2012
- “Beyond Formulas: A Collaboration between Liberal Arts Honors Underclassmen and Senior Math Majors,” *MAA Session on Projects, Demonstrations, and Activities that Engage Liberal Arts Mathematics Students*, Joint Mathematics Meetings, Boston, January 2012
- “Generalized Self-Distributivity,” *Joint Algebra and Topology Seminar*, University of Georgia, January 2011
- “Themes in Higher Dimensional Algebra,” *VIGRE Graduate Student Seminar*, University of Georgia, January 2011
- “Introduction to Categorification,” University of Oklahoma, November 2010
- “Categorical Quandles and Knots I – Definition and Examples,” *AMS Special Session on Algebraic Structures in Knot Theory*, AMS Fall Sectional Meeting, University of California at Los Angeles, October 2010
- “Analogues of Self-Distributivity,” *Algebra Seminar*, University of Glasgow, May 2010
- “2-Groups, Crossed Modules, and 2-Quandles,” University of South Alabama, February 2010
- “2-Quandles: Categorized Quandles,” *AMS Special Session on Homotopy Theory and Higher Algebraic Structures*, AMS Fall Sectional Meeting, University of California at Riverside, November 2009

- “2-Groups and Crossed Modules,” University of South Florida, September 2009
- “Loop Groups and Lie 2-Algebras,” Max Planck Institute for Mathematics, June 2009
- “The Lie Algebra of a Smooth Quandle,” *Proseminar*, University of Chicago, May 2008
- “Algebraic Categorification,” *Invariants in Low-Dimensional Topology*, Mathematisches Forschungsinstitut Oberwolfach, May 2008
- “Categorical Groups,” *Quantum Topology Seminar*, University of Illinois at Chicago, April 2008
- “Lie 2-Groups and Lie 2-Algebras,” *Proseminar*, University of Chicago, April 2008
- “2-Quandles,” *Recent Advances in Knot Theory: Quandle Theory and Categorified Knot Invariants*, AMS Sectional Meeting, Louisiana State University, March 2008
- “Lie 2-Algebras: A new relationship between algebra and topology,” University of Iowa, March 2008
- “2-groups: Categorified groups,” *Virtual Topology Seminar*, University of Iowa/Louisiana State University, March 2008
- “Categorification,” University of Iowa, March 2008
- “Generalized Self-Distributivity,” *Geometry/Topology Seminar*, Pennsylvania State University at Altoona, February 2008
- “Quandle Algebras and Cohomology Theories,” *Workshop on Knots and Quantum Computing*, University of Texas at Dallas, December 2007
- “Musical Actions of Dihedral Groups,” *Knotting Mathematics and Art: Conference in Low Dimensional Topology and Mathematical Art*, University of South Florida, November 2007
- “Lie 2-Algebras, Loop Groups, and String(n),” *Subfactor Seminar*, University of California at Berkeley, February 2007
- “Representations of Lie 2-Algebras,” *Algebraic Topology Seminar*, University of Chicago, February 2007
- “Relationships Among Algebraic Cohomology Theories,” *Quantum Topology/Hopf Algebra Seminar*, University of Illinois at Chicago, February 2007
- “A Survey of Higher Lie Theory,” *Higher Categories and Their Applications*, Fields Institute, Toronto, Canada, January 2007
- “Categorical Self-Distributivity,” *AWM Workshop*, Joint Mathematics Meetings, New Orleans, January 2007
- “Lie 2-Algebras: A New Solution of the Zamolodchikov Tetrahedron Equation,” *Deformation Theory Seminar*, University of Pennsylvania, May 2006
- “Quandles and Coalgebras,” *Knots in Washington XXII*, George Washington University, May 2006
- “Self-Distributivity in Coalgebras,” *Topology Seminar*, University of South Alabama, May 2006
- “Self-Distributivity in Coalgebras,” *Topology Seminar*, Louisiana State University, May 2006
- “Analogues of Self-Distributivity,” *Quantum Topology/Hopf Algebra Seminar*, University of Illinois at Chicago, April 2006
- “Quandle Algebras,” *Algebraic Topology Seminar*, University of Chicago, April 2006
- “Lie 2-Groups, Lie 2-Algebras, and Loop Groups,” *Midwest Topology Seminar/Category Theory and its Applications Conference in memory of Saunders Mac Lane*, University of Chicago, April 2006
- “Braids and Loop Braids,” University of Dayton, March 2006
- “2-Groups: An Introduction to Higher-Dimensional Groups,” University of South Florida, January 2006
- “Higher-Dimensional Algebra: Weakening the Notion of Equality,” *Invitation to Research Seminar*, The Ohio State University, January 2006
- “Loop Groups and Lie 2-Algebras,” *Topology Seminar*, The Ohio State University, November 2005

- “Lie algebras, Quandles, and Braids,” Low-Dimensional Algebraic Topology Seminar, The Ohio State University, November 2005
- “Lie 2-Algebras: A new solution of the Zamolodchikov Tetrahedron Equation,” *Low-Dimensional Algebraic Topology Seminar*, The Ohio State University, November 2005
- “Loop Groups and Lie 2-Algebras,” *Categories in Algebra, Geometry and Mathematical Physics Conference*, Macquarie University, Sydney, July 2005
- “2-Braids, 2-Groups and Lie 2-Algebras,” *Quantum Topology – Contemporary Issues and Perspectives Conference*, Snowbird, UT, June 2005
- “From Loop Groups to 2-Groups,” *Mathematical Physics Seminar*, Northwestern University, May 2005
- “From Loop Groups to 2-Groups,” *Algebraic Topology Seminar*, University of Chicago, May 2005
- “Higher-dimensional Group Theory,” Cal Poly San Luis Obispo, May 2005
- “Braids and Lie Theory,” *Topology Seminar*, University of California at Santa Barbara, April 2005
- “2-groups: An Introduction to Higher-Dimensional Groups,” *Claremont College Colloquium*, February 2005
- “A Solution of the Zamolodchikov Tetrahedron Equation,” *Topology/Geometry Seminar*, Pomona/Pitzer Colleges, November 2004
- “Categorification: What?, Why? and How?,” Loyola Marymount University, October 2004
- “Solutions of the Yang–Baxter and Zamolodchikov Tetrahedron Equations,” *Braid Groups and Applications Conference*, Banff Research Center (BIRS), October 2004
- “Higher Linear Algebra,” *n-Categories: Foundations and Applications Conference*, Institute for Mathematics and its Applications (IMA), June 2004
- “Lie 2-Algebras and the Zamolodchikov Tetrahedron Equation,” *Topology Seminar*, University of California at San Diego, March 2004
- “Lie 2-Algebras and the Zamolodchikov Tetrahedron Equation,” University of San Francisco, February 2004
- “Lie 2-Algebras and the Zamolodchikov Tetrahedron Equation,” Colorado College, February 2004
- “Braids and the Yang–Baxter Equation: An Application of Knot Theory to Physics,” *MAA Invited Paper Session on Applications of Topology to Biology, Chemistry, and Physics*, Joint Mathematics Meetings, Phoenix, January 2004
- “Lie 2-Algebras,” *AWM Workshop Poster Presentation*, Joint Mathematics Meetings, Phoenix, January 2004
- “Lie 2-Algebras and the Zamolodchikov Tetrahedron Equation,” *Union College Mathematics Conference*, November 2003

INVITED PRESENTATIONS

- “Curious Catalan Numbers,” Undergraduate Student Seminar, University of California at Irvine, October 2014
- “Million Dollar Mathematics!,” California State University at Fresno REU, July 2014
- “Curious Catalan Numbers,” Stanford University Mathematics Camp, July 2013
- “Curious Catalan Numbers,” California State University at Fresno REU, July 2013
- “Curious Catalan Numbers,” Mills College, February 2013
- “Defining the Complexity Number of a Graph,” San Francisco Math Circle for Teachers, February 2013
- “Curious Catalan Numbers,” California State University at Channel Islands REU, July 2012
- “Math is Foundational: The Trivium and Quadrium,” *Pi Mu Epsilon Induction Ceremony*, Millersville University, April 2012

- “P vs. NP: Quickly Solvable vs. Quickly Checkable,” Franklin and Marshall College, April 2012
- “Million Dollar Mathematics!,” *Math Awareness Month Keynote Speaker*, Bryn Mawr College, April 2012
- “Curious Catalan Numbers,” Dickinson College, April 2012
- “Curious Catalan Numbers,” Hood College, February 2012
- “Musical Groups,” Georgetown University, February 2012
- “29: A Fine Prime!,” *Pi Mu Epsilon Induction Ceremony*, West Chester University, February 2012
- “Curious Catalan Numbers,” University of Kentucky, February 2012
- “P vs. NP: Quickly Solvable vs. Quickly Checkable,” Virginia Tech, January 2012
- “Curious Catalan Numbers,” Lafayette College, February 2012
- “Trusty Transmission Techniques,” Natural Science and Mathematics Colloquium Series, St. Mary’s College of Maryland, January 2012
- “P vs. NP: Quickly Solvable vs. Quickly Checkable,” St. Mary’s College of Maryland, January 2012
- “Curious Catalan Numbers,” University of Mary Washington, December 2011
- “Musical Groups,” Loyola University of Maryland, November 2011
- “Mathematical Disguises,” James Madison University, October 2011
- “Trusty Transmission Techniques,” American University, October 2011
- “Million Dollar Mathematics,” Claremont Colleges REU, June 2011
- “Math is Foundational: The Trivium and Quadrium,” *Phi Beta Kappa Induction Ceremony*, University of Redlands, April 2011
- “Pascal’s Patterns,” *Math Club Meeting*, University of Oklahoma, November 2010
- “Quandles, Braids, and Tangles, oh my!,” California State University at Fresno, November 2010
- “Quandles, Braids, and Tangles, oh my!,” California State University at Fullerton, February 2010
- “Quandles, Braids, and Tangles, oh my!,” Cal Poly Pomona, February 2010
- “All Tied Up!,” Fullerton College, January 2010
- “Mathematical Disguises,” California State University at Los Angeles, October 2009
- “Musical Groups,” Lafayette College REU, July 2009
- “Chaotic Elections,” *Junior Faculty Seminar*, Loyola Marymount University, January 2009
- “Musical Groups,” University of Redlands, November 2007
- “Did you hear the one about...? Mathematical Anecdotes,” *Pi Mu Epsilon Induction Ceremony*, Pepperdine University, November 2006.
- “Knots, Links, and Braids, oh my!,” Whittier College, March 2006
- “Quandles: Illustrating the Relationship Between Algebra and Topology,” *Radical Pi Undergraduate Math Club*, The Ohio State University, March 2006
- “Knots, Links, and Braids, oh my!” *Radical Pi Undergraduate Math Club*, The Ohio State University, November 2005
- “Opportunities for Women Undergraduates in Mathematics,” *Undergraduate Mathematics Day*, University of Dayton, November 2005
- “Applying for Academic Jobs,” University of California at Riverside, Graduate Student Seminar, February 2005
- “Quandles, Braids, and Tangles, oh my!,” University of Redlands September 2003
- “Patterns in Pascal’s Triangle,” Pepperdine University, September 2003

OUTREACH ACTIVITIES

Summer Mathematics Program (SMP) for Undergraduate Women at Carleton College

- “Musical Groups,” SMP Colloquium, July 2014
- “The Forbidden Number,” *SMPosium*, July 2013
- “Curious Catalan Numbers,” SMP Colloquium, July 2013
- “Millennium Mathematics,” SMP Colloquium, July 2011
- Mathematician in Residence, July 2011
- “Lie Theory and Braids,” SMP Colloquium, July 2010
- Mathematician in Residence, July 2009
- “Foundations of Buildings,” with Katherine Crowley, *SMPosium*, July 2009
- “Quaternions, Octonions, and Spheres, oh my!,” *SMPosium*, July 2008
- “Introduction to Categorification,” *SMPosium*, July 2008
- “Meet the 3-sphere,” with Liz Stanhope, *SMPosium*, June 2007
- “Making Distinctions: Interpreting the Notion of Sameness,” *SMPosium*, July 2005
- “Quandles, Braids, and Tangles, oh my!,” SMP Colloquium, July 2004
- “Quandles: Illustrating the Relationship Between Algebra and Topology,” SMP Colloquium, July 2003
- Teaching Assistant, July 2000 and July 1999

Enhancing Diversity in Graduate Education (EDGE) Program

- Algebra II Instructor, Pomona College, June 2012
- Reviewed all applications and assisted in selecting 2009 cohort, April 2009
- Analysis II Instructor, Pomona College, June 2008
- “Matrix Groups: Where Symmetry meets Geometry,” Minicourse Instructor, North Carolina A & T State, June 2005
- Panel Moderator for EDGE Symposium, “Updates from the '03s,” Spelman College, June 2004
- Graduate Student Mentor, Pomona College, June 2003

Summer Program for Women in Mathematics (SPWM) at George Washington University

- “And Then There Were Four: Normed Division Algebras,” Course Instructor, June 2011 & June 2012
- “Musical Mathematics,” Colloquium Speaker, July 2008
- “ $\mathbb{R}, \mathbb{C}, \mathbb{H}, \mathbb{O}$,” Colloquium Speaker, July 2007

PATHWAYS Presentations, Los Angeles area mathematics outreach program

- “Patterns in Pascal’s Triangle,” Westminster Avenue Elementary School, February 2015
- “Careers in Mathematics,” Career Day, Lennox Academy, October 2013
- “Introduction to Knot Theory,” STEM Young Scholars, MESA Program, El Camino College, July 2010
- “Introduction to Knot Theory,” Walnut High School, November 2009
- “Patterns in Pascal’s Triangle,” Century Academy for Excellence, October 2009
- “Introduction to Knot Theory,” Windward High School, October 2008
- “Introduction to Knot Theory,” VistaMar High School, December 2007
- “Careers using Mathematics,” Westwood Charter Elementary School, November 2007

- “Patterns in Pascal’s Triangle,” Mark Twain Middle School, October 2007
- Speaker at *Fifth Grader Career Day* at Ninety-Third Street Elementary School, April 2007
- “Tricolorability and the Unknotting Number,” Diamond Bar High School, February 2007

Other Outreach Activities

- “Crossed Modules of Racks,” *Hypatian Seminar*, University of California at Santa Barbara, May 2015
- “Curious Catalan Numbers,” MSRI-UP REU Colloquium, Mathematical Sciences Research Institute, July 2013
- “Some of the Best Advice I’ve Received,” *Hypatian Seminar*, University of California at Santa Barbara, May 2013
- Career Panelist for *Envisioning a World of New Possibilities*, SESHAT Conference on Math and Science for African American Girls, Harvey Mudd College, March 2011
- “Graph Complexity,” *UCLA Math Circle*, November 2010
- “Higher-Dimensional Algebra: Weakening the notion of Equality,” *Hypatian Seminar*, University of California at Santa Barbara, November 2009
- Mathematics Instructor in Science and Engineering Community Outreach Program (SECOP) for high school students, July 2006
- “Loop Braids and the Braid Permutation Group,” *Women in Mathematics Group*, University of Southern California, October 2006
- Mathematics Instructor in the FASTSTART program for incoming minority Biomedical Science students, University of California at Riverside, August 2001

SERVICE

Thesis Students Advised

- Jessica Vega, *Just a Game? Mathematics and Puzzle-Solving*, University Honors Program, 2009 – 2010

Conferences Organized

- Cadwalladerolsker, T.; Crans, A.; and Orrison, M. *PATHWAYS for Teachers*, Harvey Mudd College, March 2009

Conference Sessions Organized

- Crans, A.; Przytycki, J.; and Szazdanovic, R. “Algebraic Structures in Knot Theory,” *MathFest 2015*, Washington DC, August 2015
- Crans, A. and Nelson, S. “Algebraic Structures in Knot Theory,” *AMS Fall Western Sectional Meeting*, University of California at Riverside, November 2009
- Crans, A. and Nelson, S. “Algebraic Structures in Knot Theory,” *AMS Special Session, Joint Mathematics Meetings*, Washington D.C., January 2009
- Crans, A. and Nelson, S. “Recent Advances in Knot Theory: Quandle Theory and Categorized Knot Invariants,” *AMS Southeastern Sectional Meeting*, Louisiana State University, March 2008
- Organizer of Panel Discussion “Surviving the first years in an academic job,” *MAA Southern CA Section NExT meeting*, October 2007
- Organizing Committee for Orange Dot Project NExT session “Capstone Conundrum,” *Mathfest 2005*, Albuquerque, August 2005
- Organizing Committee for “Orange Dot Project NExT” sessions “Getting students involved in Undergraduate Research,” “Encouraging students to Major in Mathematics,” “Developing Interdisciplinary Courses,” *Joint Mathematics Meetings*, Atlanta, January 2005

To the Mathematical Community

- Member of MAA Distinguished Lecture Selection Committee, January 2014 – present
- Member at Large of the Association for Women in Mathematics Executive Committee, January 2014 – present
- Member of Editorial Board for *Math Horizons*, Fall 2013 – present
- Member of MAA Alder Award Selection Committee, Fall 2012 – present
- Mentor for MAA “Mentoring Network” 2013 – 2014
- Referee for *Journal of Knot Theory and its Ramifications*
- Member of Selection Committee for AMS “Programs that Make a Difference” Award, 2012 – 2013
- Committee member of MAA Committee on Minority Participation in Mathematics, Fall 2012 – present
- Project NExT Consultant 2012 – 2014
- NSF Proposal Reviewer
- “The Best Advice I’ve Received,” Graduate Student Seminar, Virginia Tech, February 2012
- Panelist on Project NExT Panel “Getting Ready for Tenure,” at Mathfest 2011, Lexington, August 2011
- Panelist on Project NExT Panel “The faculty member as teacher and scholar,” *Mathfest 2011*, Lexington, August 2011
- Referee for *Theory and Applications of Categories*
- Panelist on MAA Panel “The Benefits of Hosting a Regional Undergraduate Mathematics Conference,” *Joint Mathematics Meetings*, New Orleans, January 2011
- Panelist on AWM Panel “Career Opportunities: The Early Years,” *Joint Mathematics Meetings*, San Francisco, January 2010
- Poster Judge for Undergraduate Poster Session, *Joint Mathematics Meetings*, San Francisco, January 2010
- Member of Association for Women in Mathematics *Joint Meetings Workshop Committee*, Summer 2009 – 2011
- Abstracts Reviewer for Young Mathematicians Conference at The Ohio State University, August 2009
- Referee for *Journal of Pure and Applied Algebra*
- Poster Judge for Undergraduate Poster Session, *Joint Mathematics Meetings*, Washington DC, January 2009
- Poster Judge for Undergraduate Poster Session, *Joint Mathematics Meetings*, San Diego, January 2008
- Southern California Section NExT Organizing Committee, May 2006 – present
- Poster Judge for Denman Undergraduate Research Forum, The Ohio State University, May 2006
- Poster Judge for College of Mathematics and Physical Sciences Undergraduate Research Forum, The Ohio State University, May 2006
- Panelist for Summer Opportunities Panel at Pacific Coast Undergraduate Mathematics Conference, Occidental College, March 2006
- Participant in OSU committee to improve mentoring of graduate students and postdocs, The Ohio State University, Winter 2006
- Poster Judge for Undergraduate Poster Session, MAA Southern California Section Meeting, University of Southern California, March 2005
- Panelist for “Life as a Mathematician” and “Going to Graduate School?” Panels at the Nebraska Conference for Undergraduate Women in Mathematics, University of Nebraska at Lincoln, February 2005

- Poster Judge for Undergraduate Poster Session, *Joint Mathematics Meetings*, Atlanta, January 2005
- Organizing Committee for *Infinite Possibilities Conference* for minority women in mathematics, Spelman College, April 2005
- Panelist for Graduate School Panel, Pepperdine University, Cal Lutheran, Cal State Channel Islands Seminar Series, September 2004
- Instructor of MATH 302: Apprentice Teaching, University of California at Riverside, Fall 2003 – Spring 2004
- Organizer of a teaching assistant mentor program, University of California at Riverside, Summer 2003 – Spring 2004

To the Loyola Marymount University Mathematics Department

- Departmental Peer Observation Committee, Fall 2013 – Spring 2014
- Departmental Webmaster, Fall 2009 – present
- APRC Student Advising Committee, Spring 2009
- Organizer of Departmental Student/Faculty Lunch, Fall 2008 – present
- Math Club/Pi Mu Epsilon Faculty Advisor, Fall 2004 – Spring 2005 and Fall 2006 – present
- Departmental Seminar Committee, Fall 2004 – Spring 2005, Fall 2007 – Spring 2009
- Departmental Careers Committee, Fall 2007 – Spring 2013 (Chair Fall 2009 and Spring 2010)
- Departmental Publicity Committee, Fall 2006 – Spring 2007
- Departmental Scheduling Committee, Fall 2006 – Spring 2007

To Loyola Marymount University

- University Assessment Committee for *Respect for Others and Diversity* Undergraduate Learning Outcomes, Fall 2014 – present
- Keck Career Mentor, Spring 2013 – present
- Associate Director, University Honors Program, Spring 2010
- Taiko Drum Club, Faculty Advisor, Fall 2007 – Spring 2009
- Honors Advisory Committee, Fall 2006 – Spring 2010
- Sigma Xi Science Seminar Committee, Fall 2004 – Spring 2005 and Fall 2006 – Fall 2007

COURSES TAUGHT

Abroad

- MATH 355: Methods of Applied Mathematics, *LMU Engineering, Math, and Science Program*, Bonn, Germany, Summers 2009, 2010, and 2015

Loyola Marymount University

- MATH 102: Quantitative Skills for the Modern World, Fall 2013 with additional Service-learning component
- MATH 111: Mathematical Analysis for Business I, Spring 2007
- MATH 120: Precalculus, Fall 2004
- MATH 123: Calculus II for Life Sciences, Fall 2004, Fall 2007, and Spring 2011
- MATH 131: Calculus I, Spring 2005
- MATH 132: Calculus II,, Spring 2009
- MATH 190: Workshop in Mathematics I, Fall 2007 and Fall 2013
- MATH 191: Workshop in Mathematics II, Spring 2010

- MATH 234: Calculus III, Fall 2006 and Fall 2014
- MATH 245: Ordinary Differential Equations, Fall 2008, Spring 2014, and Spring 2015
- MATH 248: Introduction to Methods of Proof, Spring 2007 and Fall 2009
- MATH 250: Linear Algebra, Fall 2009
- MATH 331: Elements of Group Theory, Spring 2010 and Spring 2011
- MATH 350: Advanced Linear Algebra, Fall 2008
- MATH 355: Methods of Applied Mathematics, Spring 2009
- MATH 357: Complex Variables, Spring 2014 and Spring 2015
- MATH 398: Women and Mathematics, Fall 2010
(team-taught with Jacqueline Dewar)
- MATH 491: Senior Seminar: “Great Theorems and Conjectures,” Spring 2011
- HONORS 140: On Motion and Mechanics, Fall 2010

The University of Chicago

- MATH 203: Analysis in \mathbb{R}^n , Spring 2008

The Ohio State University

- MATH 568: Introductory Linear Algebra, Fall 2005 and Winter 2006
- MATH 580: Algebra I, Winter 2006

University of California at Riverside

- MATH 3: College Algebra, Fall 2000 and Fall 2001
- MATH 9A: First Year Calculus, Summer 2001 and Summer 2003
- MATH 9B: First Year Calculus, Summer 2002 and Summer 2004

Pomona College

- MATH 30: Calculus I, Spring 2002
- MATH 31: Calculus II, Spring 2002

PROFESSIONAL AFFILIATIONS

- American Mathematical Society
- Association for Women in Mathematics
- Mathematical Association of America