

## Curriculum Vitae

Russ Woodrooffe

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Personal information: US citizen.

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### Research interests

Geometric and topological combinatorics,  
group theory, subgroup lattices,  
commutative algebra (face rings and edge ideals).

### Education

- PhD, 2005, Cornell University, mathematics. (Advisor [Kenneth S. Brown.](#))
- MS, 2002, Cornell University, mathematics.
- BS, 1998, University of Michigan, mathematics and computer science, honors in both.

### Academic experience

- University of Primorska (Associate Professor) Oct 2017 –
- Mississippi State University (Assistant Professor) Aug 2012 – Aug 2017
- Washington University in St. Louis
  - William Chauvenet Postdoctoral Lecturer Sep 2008 – May 2012
  - Visiting Research Scholar Jan 2008 – Aug 2008
- Weill Cornell Medical College in Qatar
  - Lecturer Aug 2006 – Dec 2007
  - Academic Assistant Aug 2005 – May 2006

### Grants

- Foreign PI on Slovenian Research Agency (ARRS) bilateral project grant, with Dragan Stevanović as PI. Award amount 1785 eur / year. (2015 – 2016)

### Honors and awards

- Guido L. Weiss Teaching and Service Award from Washington University in St. Louis Department of Mathematics (Spring 2011).

**Papers and preprints** (see <https://osebje.famnit.upr.si/~russ.woodroffe/research.html> )h-index: 10 i10-index: 10 (both according to [Google Scholar](#))

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17. John Shareshian and Russ Woodroffe, *Divisibility of binomial coefficients and generation of alternating groups*, Pacific J. Math. **292** (2018), no. 1, 223–238, [arXiv:1505.05143](#).
  16. Alireza Abdollahi, Russ Woodroffe, and Gjergji Zaimi, *Frankl's Conjecture for subgroup lattices*, Electron. J. Combin. **24** (2017), no. 3, Paper 25, 9 pages, [arXiv:1606.00011](#).
  15. Jay Schweig and Russ Woodroffe, *A broad class of shellable lattices*, Adv. Math. **313** (2017), 537–563, [arXiv:1604.03115](#).
  14. John Shareshian and Russ Woodroffe, *Order complexes of coset posets of finite groups are not contractible*, Adv. Math. **291** (2016), 758–773, [arXiv:1406.6067](#).
  13. Huy Tài Hà and Russ Woodroffe, *Results on the regularity of square-free monomial ideals*, Adv. Appl. Math. **58** (2014), 21–36, [arXiv:1301.6779](#). (A corrigendum to Lemma 3.4 of the paper appears in Adv. Appl. Math. **86** (2017), 175–177.)
  12. Russ Woodroffe, *Matchings, coverings, and Castelnuovo-Mumford regularity*, J. Comput. Algebra **6** (2014), no. 2, 287–304, [arXiv:1009.2756](#).
  11. Stephan Foldes and Russ Woodroffe, *Antichain cutsets of strongly connected posets*, Order **30** (2013), no. 2, 351–361, [arXiv:1109.5705](#).
  10. Russ Woodroffe, *Chains of modular elements and shellability*, J. Combin. Theory Ser. A **119** (2012), no. 6, 1315–1327, [arXiv:1104.0936](#).
  9. John Shareshian and Russ Woodroffe, *A new subgroup lattice characterization of finite solvable groups*, J. Algebra **351** (2012), no. 1, 448–458, [arXiv:1011.2503](#).
  8. Russ Woodroffe, *Chordal and sequentially Cohen-Macaulay clutters*, Electron. J. Combin. **18** (2011), no. 1, Paper 208, 20 pages, [arXiv:0911.4697](#).
  7. ———, *Erdős-Ko-Rado theorems for simplicial complexes*, J. Combin. Theory Ser. A **118** (2011), no. 4, 1218–1227, [arXiv:1001.0313](#).
  6. ———, *Vertex decomposable graphs and obstructions to shellability*, Proc. Amer. Math. Soc. **137** (2009), no. 10, 3235–3246, [arXiv:0810.0311](#).
  5. ———, *Cubical convex ear decompositions*, Electron. J. Combin. **16** (2009), no. 2, Research Paper 17, approx. 33 pp. (electronic), [arXiv:0709.2793](#).
  4. ———, *An EL-labeling of the subgroup lattice*, Proc. Amer. Math. Soc. **136** (2008), no. 11, 3795–3801, [arXiv:0708.3539](#).
  3. ———, *Shelling the coset poset*, J. Combin. Theory Ser. A **114** (2007), no. 4, 733–746, [arXiv:math/0306346](#).
  2. Alexander Barvinok, Sándor P. Fekete, David S. Johnson, Arie Tamir, Gerhard J. Woeginger, and Russ Woodroffe, *The geometric maximum traveling salesman problem*, J. ACM **50** (2003), no. 5, 641–664 (electronic), [arXiv:cs/0204024](#).
  1. Alexander Barvinok, David S. Johnson, Gerhard J. Woeginger, and Russ Woodroffe, *The maximum traveling salesman problem under polyhedral norms*, Integer programming

and combinatorial optimization (Houston, TX, 1998), Lecture Notes in Comput. Sci., vol. 1412, Springer, Berlin, 1998, 195–201.

### Other research products

- The On-Line Encyclopedia of Integer Sequences (2015), [Sequence A258577](#).  
Numbers  $n$  with greatest prime power divisor  $p^a$ , s.t.  $\gcd\{\binom{n}{k} : 1 \leq k \leq n-1, \binom{n}{k} \text{ is not divisible by } p\} < 1$ .
- Russ Woodroffe, *Gap.app – a native Macintosh GUI for GAP*, Version 0.5.  
(<https://cocoagap.sourceforge.io/> ).  
Version history: 0.5 – May 2018, 0.22 – Sep 2009, 0.2 – Mar 2008, 0.1 – Sep 2007.

### Research talks

- *Arrangements and the independence polynomial*:
  - Washington University in St. Louis Combinatorics seminar. St. Louis, MO (Nov 2018)
  - University of Primorska seminar. Koper, Slovenia (May 2017)
  - Spring 2017 AMS Central Sectional Meeting. Bloomington, IN (Apr 2017)
- *The story of a figure*:
  - Software Tools For Mathematics. Koper, Slovenia (Sep 2018)
- *GAP should move beyond the terminal*:
  - International Congress on Mathematical Software. Notre Dame, IN (Jul 2018)
- *Invariable generation of alternating groups by prime-power elements*:
  - Groups, Graphs, and More conference. Koper, Slovenia (May 2018)
  - BSM 100/3 Reunion Conference. Budapest, Hungary (Jun 2018)
- *Interactive investigation of lattices*:
  - Non-commutative Structures 2018 Workshop. Portorož, Slovenia (May 2018)
- *Non-contractibility and non-acyclicity of coset lattices*:
  - UNAM Morelia Topology seminar. Morelia, Mexico (Jan 2018)
- *The story of a computation; The story of a figure; Using make in unexpected ways* (3 invited short talks):
  - Software Tools For Mathematics. Morelia, Mexico (Jan 2018)
- *Order congruence lattices have convex ear decompositions*:
  - 2017 CMS Winter Meeting. Waterloo, Canada (Dec 2017)
- *Non-acyclicity of coset lattices and generation of finite groups*:
  - Fall 2017 AMS Central Sectional Meeting. Denton, TX (Sep 2017),
  - SIAM Conference on Applied Algebraic Geometry. Atlanta, GA (Aug 2017).
- *A broad class of shellable lattices*:
  - New Mexico State University colloquium. Las Cruces, NM (Feb 2017)
  - Algebraic Combinatorics and Group Actions. Herstmonceux, England (Jul 2016)
  - SUNY Binghamton Combinatorics seminar. Binghamton, NY (May 2016)
  - Spring 2016 AMS Southeastern Sectional Meeting. Athens, GA (Mar 2016)
  - University of Miami Combinatorics seminar. Miami, FL (Feb 2016)
- *Frankl's Conjecture for subgroup lattices*:

- Special Section at 2017 Joint Mathematics Meetings. Atlanta, GA (Jan 2017)
- University of Ljubljana Discrete Math seminar. Ljubljana, Slovenia (May 2016)
- *Comodernistic lattices: a lattice-theoretic analogue of solvable groups:*
  - Groups in Florence. Florence, Italy (Jun 2016)
- *Order congruence lattices are shellable / A broad class of shellable lattices:*
  - Special Section at 2016 Joint Mathematics Meetings. Seattle, WA (Jan 2016)
- *Lattice labelings and modular elements:*
  - University of Primorska seminar. Koper, Slovenia (Dec 2015)
- *Unimodal  $f$ -vectors and  $h$ -vectors of trees:*
  - University of Ljubljana Discrete Math seminar. Ljubljana, Slovenia (Dec 2015)
  - University of Mississippi Combinatorics seminar. Oxford, MS (Oct 2015)
  - Fall 2015 AMS Central Sectional Meeting. Chicago, IL (Oct 2015)
- *Order congruence lattices are CL-shellable:*
  - 8th Slovenian Conference on Graph Theory. Kranjska Gora, Slovenia (Jun 2015)
- *On an analogue of Kummer's Theorem for the number of equipartitions:*
  - 2015 International Conference in Graph Theory (hour-long plenary talk). Koper, Slovenia (May 2015)
- *Divisibility questions for alternating groups and for binomial coefficients:*
  - University of Padua Algebra seminar. Padua, Italy (May 2015)
- *Topology and combinatorics of subgroup and coset lattices:*
  - University of Georgia Topology seminar. Athens, GA (Apr 2015)
- *Several divisibility questions from group theory and combinatorics:* a poster presented at the IMA Workshop on Geometric and Enumerative Combinatorics. Minneapolis, MN (Nov 2014)
- *Coset lattices are noncontractible, even for groups with alternating factors:*
  - Fall 2014 AMS Western Sectional Meeting. San Francisco, CA (Oct 2014)
- *Some topological combinatorics for combinatorial algebraists:* a series of 4 lectures in the 2014 Atlantic Association for Research in the Mathematical Sciences (AARMS) Summer School in Commutative Algebra at Dalhousie University (Aug 2014).
- *Noncontractibility of the coset lattice and fixed points of group actions:*
  - Dalhousie University colloquium. Halifax, Canada (Aug 2014)
  - University of Primorska seminar. Koper, Slovenia (Jun 2014)
- *Regularity: a homological measure of graph complexity:*
  - International Conference on Graph Theory and Combinatorics. Rogla, Slovenia (May 2014)
- *Why coset lattices involving  $A_{15}$  are non-contractible:*
  - Spring 2014 AMS Southeastern Sectional Meeting. Knoxville, TN (Mar 2014)
- *Inclusion-exclusion and the coset lattice:*
  - Oklahoma State University Algebra seminar. Stillwater, OK (Mar 2014)
- *An absence of leaves in regularity:*
  - Fall 2013 AMS Eastern Sectional Meeting. Philadelphia, PA (Oct 2013)
  - 2013 CMS Summer Meeting. Halifax, Canada (Jun 2013)
- *Several lattices on groups:*

- Miskolc Discrete Mathematics Roundtable Workshop. Miskolc, Hungary (Jun 2013)
- *On inclusion-exclusion in the subgroup and coset lattice:*
  - 26th Cumberland Conference on Combinatorics, Graph Theory, and Computing. Murfreesboro, TN (May 2013)
- *Homology cycles in the coset posets of certain finite groups:*
  - Spring 2013 AMS Southeastern Sectional Meeting. Oxford, MS (Mar 2013)
- *Regularity of clutters with collages:*
  - Fall 2012 AMS Southeastern Sectional Meeting. New Orleans, LA (Oct 2012)
- *Modular and maximal chains in the subgroup lattice of a finite group:*
  - Conference on Universal Algebra and Lattice Theory. Szeged, Hungary (Jun 2012)
- *Noncontractibility of the coset lattice of a finite group:*
  - Spring 2012 AMS Central Sectional Meeting. Lawrence, KS (Mar 2012)
- *Shellability and its obstructions:*
  - St. Louis University colloquium. St. Louis, MO (Feb 2012)
- *Topology of subgroup lattices:*
  - Mississippi State University colloquium. Starkville, MS (Feb 2012)
- *Lexicographic labelings of posets and subgroup lattices:*
  - University of Miskolc colloquium. Miskolc, Hungary (Dec 2011)
- *Antichain cutsets of strongly connected posets:*
  - Workshop on Algebraic Topology and Combinatorics. Buenos Aires, Argentina (Nov 2011)
- *Erdős-Ko-Rado theorems on simplicial complexes:*
  - Turán Memorial Conference. Budapest, Hungary (Aug 2011)
  - University of Illinois Algebraic Combinatorics seminar, Urbana-Champaign, IL (Mar 2011)
  - BSM Reunion Conference. Budapest, Hungary (Jun 2010)
  - 23rd Cumberland Conference on Combinatorics, Graph Theory, and Computing. Oxford, MS (May 2010)
  - Spring 2010 AMS Southeastern Sectional Meeting. Lexington, KY (Mar 2010)
- *Chains of modular elements and shellability:*
  - University of Bremen Combinatorics seminar. Bremen, Germany (Jul 2011)
  - Fall 2010 AMS Central Sectional Meeting. Notre Dame, IN (Nov 2010).
- *Polytopes in subgroup and coset lattices:*
  - Rocky Mountain Mathematics Consortium Summer School on Polyhedral Combinatorics and Algebraic Combinatorics. Laramie, WY (Jun 2011)
- *Matchings, coverings, and Castelnuovo-Mumford regularity:*
  - 24th Cumberland Conference on Combinatorics, Graph Theory, and Computing. Louisville, KY (May 2011)
  - University of Kansas Algebra seminar. Lawrence, KS (May 2011)
  - Dalhousie University Commutative Algebra seminar. Halifax, Canada (Mar 2011)
  - Tulane University Algebra seminar. New Orleans, LA (Jan 2011)
  - 2010 CMS Winter Meeting. Vancouver, Canada (Dec 2010)
- *Minimax chains and topology of the subgroup lattice:*
  - University of Kansas Combinatorics seminar. Lawrence, KS (May 2011)

- University of Idaho seminar. Moscow, ID (Apr 2011)
- Dalhousie University colloquium. Halifax, Canada (Mar 2011)
- Approaches to Group Theory Conference. Ithaca, NY (Oct 2010)
- *Chordal and k-decomposable clutters*:
  - University of Illinois Combinatorics seminar. Urbana-Champaign, IL (Mar 2011)
  - Fall 2010 AMS Eastern Sectional Meeting (45 min talk). Syracuse, NY (Oct 2010)
  - Cornell University Combinatorics seminar. Ithaca, NY (Nov 2009)
  - *also presented as a poster at IPAM Workshop on Combinatorial Geometry* (Oct 2009)
- *Vertex decomposable graphs*:
  - Fall 2009 AMS Eastern Sectional Meeting. University Park, PA (Oct 2009)
  - St. Louis University Combinatorics seminar. St. Louis, MO (Mar 2009).
- *Gap.app demonstration*:
  - Groups and Computation V Conference. Columbus, OH (Mar 2008).
- *An EL-shelling of the subgroup lattice*:
  - Alfréd Rényi Institute of Mathematics Algebra seminar. Budapest, Hungary (Jun 2008)
  - St. Louis University Algebra seminar. St. Louis, MO (Apr 2008)
  - Bilkent University Algebra seminar. Ankara, Turkey (Apr 2008)
  - Summer School on Algebra and Combinatorics. Lisbon, Portugal (Jun 2007)
- *Groups, posets, and shellings*:
  - American University of Sharjah seminar. Sharjah, UAE (Apr 2006)
  - American University in Cairo seminar. Cairo, Egypt (Mar 2006)
  - Qatar University seminar. Doha, Qatar (Mar 2006)
  - BSM Reunion conference. Budapest, Hungary (Jun 2005)

**Research advising** (see <https://osebje.famnit.upr.si/~russ.woodrooffe/advising.html> )

**Graduate:**

- Directing PhD thesis of Andrés Santamaría Galvis (Fall 2017 - ).
- Directed masters project of Lee Hathcock, *Relaxations of the weakly chordal condition in graphs* (Summer 2016 – Summer 2017).
- Advised research visit of Alper Ülker, a PhD student at Ege University who received a year-long Visiting Scholar grant from the Council of Higher Education of Turkey to work with me at Mississippi State University (Spring 2014 – Fall 2014).
- Directed masters project of Bonnie Sessions: *EL-labelings of colored graph posets and exponential structures* (Spring 2013).

**Undergraduate:**

- Directed undergraduate research project of Ethan Brockman: *Independence polynomials of claw-free graphs and trees* (Fall 2015).
- Directed undergraduate research project of Bailey Swinford: *Divisibility of binomial coefficients at  $p = 2$*  (Fall 2015).
- Directed undergraduate research project of Joshua Dean: *Homology using linear algebra* (Spring 2014).
- Directed honors thesis project of Yoni Marshall: *Ramsey theory: from finite to infinite* (Spring 2011).

**Mathematical outreach** (see <https://osebje.famnit.upr.si/~russ.woodrooffe/outreach.html>)

- Math Club talk for undergraduates: *The probability of generating a group*, Rhodes College (Apr 2017), Mississippi State University (Jan 2017).
- Public talk at outreach event “The Talk: Promoting STEM In Youth”: *Prime divisibility of binomial coefficients*, Tupelo MS (Nov 2016).
- Math Club talk for undergraduates: *How to type Mathematics in LyX*, Mississippi State University (Sep 2016, Sep 2014), University of Primorska (May 2014).
- Math Club talk for undergraduates: *Small, large, and typical gaps between primes*, Mississippi State University (Sep 2015).
- Math Club talk for undergraduates: *A conjecture on divisibility of binomial coefficients*, University of Primorska (May 2014), Rhodes College (Jan 2014), Mississippi State University (Apr 2013).
- Math Circle activities for middle and high school students: *Nonplatonic polyhedra*, Ferguson Middle School (Sep 2011), Washington University in St. Louis (Sep 2011, Oct 2009).
- Math Circle activities for middle and high school students: *Graph theory*, Washington University in St. Louis (Feb 2011, Jan 2009).
- Math Club talk for undergraduates: *Vertex-edge-face numbers of polyhedra*, Washington University in St. Louis (Apr 2010).
- Math Circle for elementary school teachers: *Polyhedra*, Metamorphic Math Center, St. Louis (Mar 2009).
- Math Club talk for pre-medical students: *How big is infinity?*, Weill Cornell Medical College in Qatar (Dec 2007).
- Math Club talk for pre-medical students: *Subsets, counting, and polynomials*, Weill Cornell Medical College in Qatar (Nov 2006).
- Math Club talk for pre-medical students: *The Fibonacci numbers*, Weill Cornell Medical College in Qatar (Oct 2006).

**Conference, section, and workshop organization**

- Co-organized (with Ted Dobson, Klavdija Kutnar, Dragan Marušič, Bernd Schroeder, and Laura Sheppardson) the “[6th Annual Mississippi Discrete Mathematics Workshop](#)”, held Nov 2018 at the University of Mississippi.
- Co-organized (with Ted Dobson, Klavdija Kutnar, Dragan Marušič, and Laura Sheppardson) the “[5th Annual Mississippi Discrete Mathematics Workshop](#)”, held Nov 2017 at the University of Mississippi.
- Co-organized (with Ted Dobson, Klavdija Kutnar, Dragan Marušič, and Laura Sheppardson) the “[4th Annual Mississippi Discrete Mathematics Workshop](#)”, held Nov 2015 at the University of Mississippi.
- Co-organized (with Eric Gottlieb) the [Special Section on Topological Combinatorics](#) at the AMS Fall Southeastern Sectional Meeting, held Oct 2015 at the University of Memphis.
- Co-organized (with Ted Dobson, Klavdija Kutnar, Dragan Marušič, and Laura Sheppardson) the “[3rd Annual Mississippi Discrete Mathematics Workshop](#)”, held Nov 2014 at Mississippi State University.
- Co-organized (with Ted Dobson, Klavdija Kutnar, Dragan Marušič, and Laura Sheppardson) the “[2nd Annual Mississippi Discrete Mathematics Workshop](#)”, held Nov 2013 at Mississippi State University.

- Co-organized (with John Shareshian) the [Special Section on Topological Combinatorics](#) at the AMS Fall Central Sectional Meeting, held Oct 2013 at Washington University in St. Louis.
- Co-organized (with Ted Dobson) an “[Impromptu Combinatorics Workshop](#)”, held Nov 2012 at Mississippi State University.
- Webmaster of [homepage](#) for the conference “Approaches to Group Theory”, held Oct 2010 at Cornell University.

### Other service related to mathematics

- Member of Editorial Board, *The Art of Discrete and Applied Mathematics*, 2018 –.
- Organized Algebra/Combinatorics/Topology Seminar at Mississippi State University, Fall 2015, Spring 2017, sporadically in between.
- Served as Webmaster for departmental webpage [www.math.msstate.edu](http://www.math.msstate.edu) at Mississippi State University. Significantly redesigned the [news](#) and [seminars](#) sections for better communication, among other updates, Fall 2014 – Spring 2017.
- Co-organized [Mississippi State Math Club](#), Fall 2013 – Spring 2017.
- Organized Top Combo Fun Seminar at Mississippi State University, Fall 2012 – Spring 2015.
- Organized Combinatorics Seminar at Washington University in St. Louis, Fall 2009 – Spring 2012.
- Organized Math Club at Weill Cornell Medical College in Qatar, Fall 2006 and 2007.
- Contributed several patches to LyX mathematical word processor: question environment, improved cases environment, bug-fixes for AMS document classes.
- Refereed for journals: Ann. Comb., Australas. J. Combin., Bull. Inst. Combin. Appl., Combinatorica, Discrete Math., Elec. J. Combin., European J. Combin., Exp. Math., Glasgow Math. J., J. Algebra Appl., J. Algebraic Combin., J. Combin. Theory Ser. A, J. London Math. Soc., J. Pure Appl. Algebra, Math. Scand., Math. Slovaca, Order, Proc. Amer. Math. Soc., Publ. Math. Debrecen, Siam J. Discrete Math., Trans. Amer. Math. Soc.
- Math Reviews [reviewer](#).
- MathOverflow [contributor](#).
- Member of professional organizations: American Mathematical Society, European Mathematical Society.

### Non-mathematical service

- Elected as departmental representative for College of Arts & Sciences Faculty Senate, served Fall 2015 – Spring 2017.
- Served as faculty mentor/liaison to a freshman residence hall as part of the Faculty Associates Program at Washington University in St. Louis, 2009 – 2010 academic year.
- Served as discussion leader for Freshman Reading Program at Weill Cornell Medical College in Qatar (Aug 2007) and Washington University in St. Louis (Aug 2009, Aug 2010).
- Served on Committee on Pre-medical Admissions at Weill Cornell Medical College in Qatar, 2006 – 2007 academic year.



### **Technical skills**

- Experienced programmer, with knowledge in GAP, C, C++, Objective C, and various other languages and environments.
- Worked as programmer/computer consultant, 1993-1998.