

# Edward L. Richmond

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## Education:

- University of North Carolina - Chapel Hill, NC  
Ph.D, Mathematics (May 2008)  
Advisor: Prakash Belkale  
Thesis title: Recursive structures in the cohomology of flag varieties
  - Colgate University - Hamilton, NY  
BA, Mathematics, with honors (May 2000)
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## Research Interests:

I am interested in algebraic combinatorics, algebraic geometry, representation theory and Lie theory. In particular, I work with geometric and algebraic aspects of Schubert varieties, flag varieties, Coxeter groups and related topics.

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## Employment:

- Assistant Professor, Oklahoma State University, Stillwater, OK (Fall 2013-present)  
(on leave Fall 2013-Spring 2014)
  - Learning and Teaching Fellow, University of British Columbia - Vancouver, BC (Fall 2013 - Spring 2014)
  - Visiting postdoctoral researcher, ICERM - Providence, RI (Spring 2013)
  - Postdoctoral Fellow, University of British Columbia - Vancouver, BC (Fall 2010 - Spring 2013)
  - Visiting Assistant Professor, University of Oregon - Eugene, OR (Fall 2008 - Spring 2010)
  - Teaching Fellow, UNC - Chapel Hill, NC (Fall 2002 - Spring 2008)
  - Math Help Center Director, UNC - Chapel Hill, NC (Fall 2006 - Spring 2007)
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## Grants and Awards:

- NSA Young Investigators grant "Combiatorics and geometry of Schubert varieties" (2016-2017). Amount: \$40,000.
  - OSU Deans Incentive Grant (2016). Amount: \$3,000.
  - Partially funded by NSF FRG Grant DMS-05-54349, Fall 2006, Spring 2007, Summer 2007.
  - UNC Graduate School Transportation Grant, Fall 2007.
  - Nominated for the J. Burton Linker Award for Excellence in Teaching, 2008
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## Papers and preprints:

1. *A noncommutative geometric Littlewood-Richardson rule.*  
with V. Tewari and S. Van Willigenburg, in preparation.
  2. *Staircase diagrams and the enumeration of smooth Schubert varieties.*  
with W. Slofstra, submitted.
  3. *Billey-Postnikov decompositions and the fibre bundle structure of Schubert varieties.*  
with W. Slofstra, to appear in *Math. Ann.*
  4. *Littlewood-Richardson coefficients for reflection groups.*  
with A. Berenstein, *Advances in Math.*, vol 284 (2015), 22, 54-111.
  5. *A combinatorial characterization of tight fusion frames.*  
with M. Bownik and K. Luoto, *Pacific J. Math.* vol 275 (2015), no. 2, 257294.
  6. *Rationally smooth elements of Coxeter groups and triangle group avoidance.*  
with W. Slofstra, *J. Algebraic Combin.* 30 (2014), no. 39, 659-681.
  7. *Eigenvalues of hermitian matrices and equivariant cohomology of Grassmannians.*  
with D. Anderson and A. Yong. *Compositio Math.* vol 149 (2013), 1569-1582.
  8. *The Belkale-Kumar cup product and relative Lie algebra cohomology. (Appendix)*  
with S. Evens. and W. Graham, *Int. Math. Res. Not.* 2013 (2013), 1901-1933.
  9. *A multiplicative formula for structure constants in the cohomology of flag varieties.*  
*Michigan Math. J.* 61 (2012), no. 1, 3-17.
  10. *Branching Schubert calculus and the Belkale-Kumar product on cohomology.*  
with N. Ressayre, *Proc. Amer. Math. Soc.* 139 (2011), no. 3, 835-848.
  11. *A partial Horn recursion in the cohomology of flag varieties.*  
*J. Algebraic Combin.*, 30 (2009), 1-17.
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## Teaching Experience at the Oklahoma State University:

- Intro to Modern Algebra (Math 3613) - Fall 2015
- Linear Algebra (Math 2013) - Spring 2015, Fall 2015
- Calculus II (Math 2153) - Fall 2014

## Teaching Experience at the University of British Columbia:

- Multi-variable Calculus (Math 253) - Fall 2011, Fall 2012
- Multi-variable Calculus (Math 200/253) - Summer 2011

## Teaching Experience at the University of Oregon:

- Calculus I (Math 251) - Fall 2008
- Differential Equations (Math 256) - Fall 2009
- Putnam Prep (Math 407) - Fall 2009
- Discrete Mathematics I (Math 231) - Fall 2008, Fall 2009
- Discrete Mathematics II (Math 232)- Winter 2009, Winter 2010, Spring 2010

- Discrete Mathematics III (Math 233)- Spring 2009, Spring 2010
- Linear Algebra (Math 341) - Winter 2009

**Teaching Experience at the University of North Carolina:**

- Business Calculus (Math 152) - Spring 2003, Fall 2003
- Pre-Calculus (Math 130) - Summer 2005
- Calculus I (Math 231) - Spring 2004
- Calculus II (Math 232) - Fall 2004, Spring 2005, Fall 2005, Spring 2006, Summer 2006
- Multi-variable Calculus (Math 233) - Fall 2007

**Research Talks (since 2010):**

- AMS Western Sectional Meeting, University of Utah - Salt Lake, UT, April 2016.
- Lie Theory seminar, Oklahoma State University - Stillwater, OK, May 2015.
- Combinatorics seminar - University of Illinois - Urbana, IL, April 2015.
- Southwest Local Algebra Meeting - Oklahoma State University - Stillwater, OK, March 2015.
- Number Theory seminar, Oklahoma State University - Stillwater, OK, January 2015.
- AMS-MAA Joint Meetings 2015 - San Antonio, TX, January 2015.
- Representation theory seminar, University of Oklahoma - Norman, OK, December 2014.
- AMS Southeastern Sectional Meeting, UNC - Greensboro - Greensboro, NC, November 2014.
- Lie Theory seminar, Oklahoma State University - Stillwater, OK, October 2014.
- Colloquium, Oklahoma State University - Stillwater, OK, September 2014.
- 20th Coast Combinatorics Conference, University of Victoria - Victoria, BC, March 2014.
- Algebraic Geometry Seminar, UBC - Vancouver, BC, January 2014.
- AMS-MAA Joint Meetings 2014 - Baltimore, MD, January 2014.
- Poster session for Whittaker Functions, Schubert calculus and Crystals conference, ICERM - Providence, RI, March 2013.
- AMS-MAA Joint Meetings 2013 - San Diego, CA, January 2013.
- 2012 CMS Winter Meeting - Montreal, QB, December 2012.
- Discrete Math Seminar, UBC - Vancouver, BC, November 2012.
- Algebraic Geometry Seminar, UBC - Vancouver, BC, October 2012.
- Poster session for the MSJ-SI 2012 Schubert calculus conference, Osaka City University - Osaka, Japan, July 2012.
- Algebraic and Combinatorial approaches to representation theory conference, University of California - Riverside, CA, May 2012.
- Algebra Seminar, University of Oregon - Eugene, OR, April 2012.

- Algebra Seminar, University of Ottawa - Ottawa, ON, March 2012.
- AMS Western Sectional Meeting, University of Hawaii, Honolulu, HI - March 2012.
- Algebraic Groups seminar, UBC - Vancouver, BC, February 2012.
- AMS-MAA Joint Meetings 2012 - Boston, MA, January 2012.
- 2011 CMS Winter Meeting - Toronto, ON, December 2011.
- Discrete Math Seminar, Simon Fraser University - Burnaby, BC, July 2011.
- Combinatorics Seminar, University of Washington - Seattle, WA, May 2011.
- AMS Western Sectional Meeting, University of Las Vegas - Las Vegas, NV, April 2011.
- Discrete Math Seminar, UBC - Vancouver, BC, March 2011.
- Geometric Methods in Representation Theory Seminar, University of North Carolina - Chapel Hill, NC, March 2011.
- Combinatorics Seminar, University of Michigan - Ann Arbor, MI, February 2011.
- Lie Theory Seminar, University of Notre Dame - South Bend, IN, February 2011.
- Poster session for the Western Algebraic Geometry Seminar, University of Arizona - Tucson, AZ, November 2010.
- Discrete Math Seminar, UBC - Vancouver, BC, October 2010.
- Algebra Seminar, University of Oregon - Eugene, OR, October 2010.
- Algebraic Geometry Seminar, UBC - Vancouver, BC, September 2010.

**Non-Research Talks:**

- OSU math club - Stillwater, OK, October 2015.
- Stillwater High School math club - Stillwater, OK, September 2015.

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**Academic Service:**

- Referee for several journals.
- Master of Ceremonies for the team competition at OSU Math Day for high school students, October 8, 2015.
- Co-organizer for a special session in Algebraic Combinatorics at the AMS Western Section meeting in Salt Lake, UT, April 9-10, 2016.
- AMS-MAA Joint Committee on Teaching Assistants and Part-Time Instructors - 2016-2019.
- Putnam committee, OSU Fall 2015.
- Undergraduate committee, OSU - 2015-2016.
- Appointments committee, OSU - 2014-2015.
- Assistant course designer for Math 104, Business Calculus at UBC - 2013-2014.
- Organizer of the Algebraic Geometry Seminar at UBC, 2010-2013.

- Volunteer representing UBC mathematics at an Opportunity Fair for high school students, Lord Byng Secondary School, November 15, 2012.
  - Volunteer for Math Mania for elementary school students at UBC, June 8, 2011 and July 19, 2012.
  - Master of Ceremonies at ELMACON 2012 (math contest for elementary school students) at UBC, May 5, 2012.
  - Volunteer for a Math Workshop for high school students in Richmond, BC, February 2, 2012.
  - Organizer of a working seminar in intersection homology and its applications, Spring 2011.
  - Organizer of the Bellingham Algebraic Geometry Seminar, March 5, 2011.
  - Course coordinator for Discrete mathematics for computer science majors at the University of Oregon, 2009-2010.
  - Organizer of the Problem Solving Seminar for undergraduates and supervisor for the Oregon Putnam team, Fall 2009.
  - Volunteer grader for the Euclid Contest for high school students, April 2011, 2012.
  - Exam editing committee for the Oregon Invitational Mathematics Tournament for high school students, Spring 2009.
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