

Curriculum vitæ

Alex Fink

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Education

- 2006– (in progress) PhD, mathematics, with Bernd Sturmfels and Federico Ardila, University of California, Berkeley
- 2002–2006 BSc Honours, pure mathematics, and BSc Honours, computer science, University of Calgary

Grants, research funding, academic awards

- 2006–2009 Berkeley Fellowship (UC Berkeley)
- 2007–2008 NSERC Julie Payette PGS M Research Scholarship
- 2006 Muriel Kovitz Prize; Governor General’s Medal - Silver; Lieutenant Governor’s Gold Medal; Faculty of Science Gold Medal; Department of Computer Science Silver Medallion; Department of Mathematics and Statistics Silver Medallion (University of Calgary)
- 2005 Verity Inc. Scholarship in Computer Science (University of Calgary)
- 2004–2005 Special Merit Scholarship (University of Calgary)
- 2003–2005 NSERC Undergraduate Summer Research Awards
- 2003–2005 Louise McKinney Scholarship (University of Calgary)
- 25th Anniversary Scholarship in Mathematics and Statistics (University of Calgary)
- 2002 Alexander Rutherford scholarship (University of Calgary)

- 2003–2006 William Lowell Putnam mathematics competition: ninth, 2003; fifteenth, 2004; honourable mention, 2005; ninth, 2006.
- 2004–2005 ACM International Collegiate Programming Competition: fifteenth, 2004; finalist, 2005.

Research interests Combinatorics with applications to algebra and geometry.

Publications

Articles in preparation

- *Chow polytopes and tropical cycles.*
- *The tropical Stiefel map.*
- with David Speyer, on the Tutte polynomial via K-theory of the Grassmannian and vector bundle versions of polytope identities.
- with Aaron Siegel and Richard Nowakowski and David Wolfe, *Toppling conjectures.*

Preprints, submitted articles

- with Harm Derksen, *Valuative invariants for polymatroids*, arXiv:0908.2988.
- *The binomial ideal of the intersection axiom for conditional probabilities*, submitted to J. of Algebraic Combinatorics, arXiv:0902.1495.
- with Benjamin Iriarte Giraldo, *Bijections between noncrossing and nonnesting partitions for classical reflection groups*, to appear in Portugaliae Mathematica, extended abstract to appear in Discrete Mathematics and Theoretical Computer Science, arXiv:0810.2613.
- with Federico Ardila and Felipe Rincón, *Valuations for matroid polytope subdivisions*, to appear in Canadian Math. Bulletin **52**, arXiv:0710.4424v2.

Journal articles

- with Richard Guy and Mark Krusemeyer, *Partitions with parts appearing at most thrice*, Contributions to Discrete Math. **3** (2008), #79.
- with Richard Guy, *The number-pad game*, Coll. Math. J. **38** (2007), 260264.
- *A generalization of an IMO problem*, Integers, Electronic Journal of Combinatorial Number Theory **6** (2006), #A17.
- with Bill Sands, *Rationals whose sum equals the reciprocal of their product*, Crux Math. **30** (2004), 292–295.

Conference publications

- with Jörg Denzinger and John Aycock, *Extracting NPC behavior from Computer Games using Computer Vision and Machine Learning Techniques*, IEEE Symposium on Computational Intelligence and Games, 2007, 24–31.

Expository writing

- with Richard Guy, *Rick's Tricky Six Puzzle: S_5 sits specially in S_6* , Math. Magazine **82** no. 2 (April, 2009).
- *If two were three, what would Hex be?*, 2008, Gathering for Gardner 8.
- with Derek Kisman and Richard Guy, *Patulous pegboard polygons*, 2006, Gathering for Gardner 7.

Lectures

Invited lectures, excluding seminars

- 2009 (upcoming) *Tropical varieties as Minkowski weights and Chow polytopes*, Program on tropical geometry in combinatorics and algebra, MSRI.
- *Universality for valuations of matroid polytope subdivisions*, Special session on matroids in algebra and geometry, 1049th sectional meeting of the American Mathematical Society.
- 2007 *Extracting NPC behavior from Computer Games using Computer Vision and Machine Learning Techniques*, IEEE Symposium on Computational Intelligence and Games.

Seminars, and talks associated to courses

- 2009 *Matroid and polymatroid decompositions and subdivisions*, Berkeley discrete math seminar.
- *Reparametrizations of the Grassmannian*, Berkeley course in tropical geometry.
- *Valuations for matroid subdivisions*, Michigan combinatorics seminar.
- 2008 *The binomial ideal of the intersection axiom*, Berkeley course in algebraic statistics.
- *Noncrossing and nonnesting partitions*, Santa Clara University.
- *Noncrossing and nonnesting partitions*, San Francisco State University algebra-geometry-combinatorics seminar.
- *Noncrossing and nonnesting partitions*, Berkeley discrete math seminar.
- *Noncrossing and nonnesting partitions*, Berkeley combinatorics summer seminar.
- *On the regularity of certain monomial projective curves*, Berkeley course in commutative algebra.

Lighter fare

- 2008 *Hex and the Brouwer fixed point theorem*, Many Cheerful Facts, a casual graduate-student-run seminar at Berkeley.
- 2007 *Surreal numbers*, Many Cheerful Facts.

Seminars run

- 2009 with Franziska Schroeder, Graduate student tropical geometry seminar, MSRI.
- 2006–2007 with William Slofstra, Many Cheerful Facts, Berkeley.

Journal refereeing

- Integers: the electronic journal of combinatorial number theory

Mentoring activities

- 2006–2007 Coaching contestants in the ACM International Collegiate Programming Competition, Calgary.
- 2002–2006 Volunteer at the math enrichment program and International Math. Olympiad training program, Calgary.