

## Curriculum Vitae

David Perkinson

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### Employment and education

2024 – present    **Professor of Mathematics, Emeritus**, Reed College  
1990 – 2024    **Professor of Mathematics**, Reed College, Department of Mathematics  
1990    **Ph.D. in Mathematics**, University of Chicago  
          Advisor: William Fulton  
          Thesis: *Jet Bundles and Curves in Grassmannians*  
1981    **BA in Mathematics**, Grinnell College (with honors)

### AS VISITOR:

2018 – 2019    **Research Associate**, Massachusetts Institute of Technology, Cambridge, MA  
Jan. 2014    **Lecturer**, African Institute for Mathematical Sciences, Cameroon  
Jan. 2013    **Lecturer**, African Institute for Mathematical Sciences, Ghana  
Jan./Feb. 2012 **Lecturer**, African Institute for Mathematical Sciences, South Africa  
1997 – 1998    **Visiting Researcher**, University of Genoa, Italy  
1993 – 1994    **Visiting Researcher**, University of Norway, Oslo

### Awards

F. L. Griffin Chair of Mathematics, Reed College  
Lawrence and Josephine Graves Teaching Prize, University of Chicago  
Linn Smith Prize for Excellence in Mathematics, Grinnell College

### Research interests

Abelian sandpile model, algebraic geometry, combinatorics

### Publications

- *Cycle systems, coparking functions, and  $h$ -vectors of matroids*, with Scott Corry, Anton Dochtermann, Solís McClain, and Lixing Yi; preprint, [arXiv:2509.11460](https://arxiv.org/abs/2509.11460), 2025
- *Simplicial dollar game*, with Jesse Kim; *Electronic Journal of Combinatorics*, Volume 29 (2) 2022
- *Counting weighted maximal chains in the circular Bruhat order*, with Gopal Goel and Olivia McGough; to appear in *Journal of Combinatorial Theory, Series A*, 2022.
- *Enumerating linear systems*, with Sarah Brauner and Forrest Glebe; *Mathematische Zeitschrift*, Volume 296, (3–4), 2020
- *Book review* of *The Mathematics of Chip-firing*, by Caroline Klivans, for the Mathematical Association of America, 2019
- *Critical groups of iterated cones*, with Gopal Goel; *Linear Algebra and its Applications*, Volume 567, 2019
- *Divisors and Sandpiles*, with Scott Corry; American Mathematical Society, 2018

- [Biographical arrangements](#), with Sam Hopkins;  
eprint: [arxiv.org/abs/1212.4398](https://arxiv.org/abs/1212.4398); *Trans. of the Amer. Math. Soc.*, (368) 2016
- [Sandpiles and dominos](#), with Laura Florescu, Daniela Morar, Nick Salter, and Tianyuan Xu;  
*Electronic Journal of Combinatorics*, Volume 22 (1) 2015
- [Sandpiles, spanning trees, and plane duality](#), with Melody Chan, Darren Glass, Matthew Macauley, Caryn Werner, and Qiaoyu Yang;  
eprint [arxiv.org/abs/1406.5147](https://arxiv.org/abs/1406.5147); *SIAM Journal on Discrete Mathematics (SIDMA)*, 2014
- [G-parking functions and tree inversions](#), with Qiaoyu Yang and Kuai Yu;  
eprint: [arxiv.org/abs/1309.2201](https://arxiv.org/abs/1309.2201); *Combinatorica*, 2015
- [Primer for the algebraic geometry of sandpiles](#), with Jacob Perlman and John Wilmes;  
*Tropical and Non-Archimedean Geometry*, Contemp. Math., 605, Amer. Math. Soc., Providence, RI, 2013
- [Orientations, semiorders, arrangements and parking functions](#), with Sam Hopkins;  
*The Electronic Journal of Combinatorics*, Volume 19(4), 2012
- [The Abelian Sandpile Model](#), a Sage Thematic Tutorial;  
[sagemath.org/doc/thematic\\_tutorials/sandpile.html](https://sagemath.org/doc/thematic_tutorials/sandpile.html)
- [A note on the critical group of a line graph](#), with Nick Salter and Tianyaun Xu; *The Electronic Journal of Combinatorics*, Volume 18(1), 2011
- [Permutation Polytopes and Indecomposable Elements in Permutation Groups](#), with R. Guralnick;  
*Journal of Combinatorial Theory, Series A*, 113, (2006), no. 7
- [Some facets of the polytope of even permutation matrices](#), with Jeffrey Hood; *Linear Algebra and its Applications*, 381 (2004)
- [Eight Lectures on Monomial Ideals](#), with Ezra Miller; *Queens Papers in Pure and Applied Mathematics*, no. 120, Queen's Univ., 2001
- [Inflections of toric varieties](#), *Michigan Math. J.* 48, 2000
- [Principal parts of line bundles on toric varieties](#), *Compositio Mathematica* 104, 1996
- [Curves in Grassmannians](#), *Transactions of the AMS*, September 1995

### Course notes

- Math 201 *Linear Algebra*, Fall 2019, revised Fall 2021.
- Math 112 *Introduction to Analysis*, Spring 2021.
- Math 341 *Topics in Geometry (manifolds)*, Spring 2020.
- Math 113 *Discrete Structures*, joint work with Kyle Ormsby, Spring 2020.
- Math 321 *Real Analysis*, Fall 2002.
- Math 211 *Multivariable Calculus*, Summer 2000, revised Fall 2007 and Fall 2010.

### Recent professional activities

#### 2026

- [Cycle systems, coparking functions, and h-vectors of matroids](#), Colloquium, Brown University, March 2, 2026

**2021**

- Cascade Lectures in Combinatorics, (attended online conference), November 6, 2021
- *Counting weighted maximal chains in the circular Bruhat order*, research project with Gopal Goel and Olivia McGough, summer 2021
- *Sandpiles and Dominos*, MaTTS (Mathematics Teacher-Scholar Symposium), Reed College May 23, 2021

**2020**

- *Firing lattices*, research project with Ram Goel, Lex Lei, Rupert Li, and Olly Milshtein, Summer 2020

**2019**

- *Simplicial Dollar Game*, SIAM PNW Conference, special session on *Algebra, Geometry, and Applications* October 19, 2019
- *A Chip-Firing Miscellany*, Portland State University, May 14, 2019
- *Enumerating Linear Systems on Graphs*, Cornell University, April 22, 2019
- *Special Session on Chip-firing and Divisor Theory*, co-organizer with Caroline Klivans, AMS Spring Eastern Sectional Meeting, April 13, 2019

**2018**

- *Enumerating Linear Systems on Graphs*, MIT Combinatorics Seminar, Massachusetts Institute of Technology, November 21, 2018
- *Enumerating Linear Systems on Graphs*, Algebraic and Tropical Geometry Seminar, Yale University, November 15, 2018
- *The Threshold Density Theorem*, Yale Undergraduate Mathematics Society, November 14, 2018
- *The Threshold Density Theorem*, Discrete Mathematics Seminar Texas State University, San Marcos, October 26, 2018
- *Enumerating Linear Systems on Graphs*, Chip-firing Seminar, Texas State University, San Marcos, October 25, 2018
- *Canada/USA MathCamp*, Colorado School of Mines, Golden CO, June 24–29, 2018

**2017**

- [A GPU approach to Abelian Sandpile visualization](#), research project with Cameron Fish, Summer 2017
- WATCH US (Women Achieving Through Community Hubs) Stakeholders Meeting, July 8–10, 2017
- Referee for the *International Conference on Formal Power Series and Algebraic Combinatorics*, December 2017

**2016**

- *Lattice point enumeration techniques for linear systems on graphs*, research project with Sarah Brauner, Forrest Glebe, Gopal Goel, and Palek Jain, Summer 2016
- Referee for the *SIAM Journal of Discrete Mathematics*, May 2016
- *Sandpiles, spanning trees, and plane duality*, invited talk at the special session on *Algebraic and Topological Methods in Combinatorics* at the Joint Mathematics Meeting, Seattle WA, January 2016.

- Referee for the *International Conference on Formal Power Series and Algebraic Combinatorics*, November 2016

**2015**

- *Weierstrass points on tropical curves*, research project with Madeline Brandt, Summer 2015
- Co-organizer for the BIRS-CMO workshop, *Sandpile Groups*, Oaxaca, Mexico, November 15–20, 2015
- *Tree inversions and parking functions*, invited talk at the special session on *Algebraic-Geometric Methods in Graph Theory* at the AMS Western Sectional Meeting, Las Vegas, NV, April 2015
- *Sandpiles and Dominos*, Claremont Colleges Mathematics Colloquia, Claremont CA, February 18, 2015
- *MathPath*, Lewis and Clark College, Portland OR, July 14–18, 2015

**2014**

- Referee for *Directions for Mathematics Research Experiences for Undergraduates*, World Scientific, December 2014
- *Tree inversions and parking functions*, University of Idaho, Moscow, October 23, 2014
- *Tree inversions and parking functions*, invited talk for the special session on *Computational Aspects of Algebra, Geometry and Combinatorics* at MathFest, August 8, 2014
- Referee for *Advances in Mathematics*, August 2014
- Mentor/lecturer at the Pacific Undergraduate Research Experience in Mathematics (PURE) program, Hilo, Hawaii, July 22-28, 2014
- McDougal Lecture in Mathematics, Lawrence University, *Sandpiles and Dominos*, May 2014
- *The mathematics of juggling: theory and applications*, African Institute for Mathematical Sciences, Cameroon, January 15, 2014.
- Referee for *Journal of Algebraic Combinatorics*, January 2014
- Referee for the *International Conference on Formal Power Series and Algebraic Combinatorics*

**2013**

- Invited speaker in the special session on applied combinatorics at the Mathematical Congress of the Americas, Guanajuato, Mexico, August 5–9
- Referee for the *International Mathematics Research Notices*
- Co-organizer for the AIM workshop, Generalizations of chip-firing and the critical group, July 8–12
- Referee for the *Journal of Algebraic Combinatorics*
- Project NExT panelist, “Keeping Your Research Alive”, Willamette University, April 13
- *Biographical arrangements*, invited participant and speaker in the Perspectives and Emerging topics in Algebra and Kombinatorics (PEAKs) workshop, Haus Bergkranz, Austria, March 17-23
- *The mathematics of juggling: theory and applications*, African Institute for Mathematical Sciences, Ghana, January 24, 2013.

**2012**

- *Parking functions and hyperplane arrangements*, Mathcamp 2012, University of Puget Sound, July 19

- *Orientations, Semiorders, Arrangements, and Parking Functions*, SIAM Conference on Discrete Mathematics, Halifax, Nova Scotia, June 19
- Participant in “Sage Education Days 4,” University of Washington, Seattle, Washington, June 13–15
- Referee for *Ars Mathematica Contemporanea*
- AIM workshop on *Collaborative authoring of scholarly documents*, Palo Alto, April 14–15
- *The algebraic geometry of sandpiles*, University of Michigan, Ann Arbor, April 6
- *Sandpiles, dominos, arrangements, and ideals*, Pacific University, March 20
- Referee for the *Journal of Algebraic Combinatorics*
- *What is a liberal arts college?*, African Leadership Academy, Johannesburg, SA, February 15
- *An invitation to sandpiles*, University of Witwatersrand, Johannesburg, SA, February 14
- *An invitation to sandpiles*, University of Cape Town, Cape Town, SA, February 8
- *An invitation to sandpiles*, Stellenbosch University, Stellenbosch, SA, February 3

**2011**

- *Orientations, semiorders, arrangements, and parking functions*, UTEP Colloquium Series, November 18
- *Sandpile and Dominos*, UConn Math Club, University of Connecticut, October 30
- *G-semiorder arrangements and G-parking functions*, MIT Combinatorics Seminar, Massachusetts Institute of Technology, October 7
- *Sandpile and Dominos*, Mathcamp 2011, Reed College, July 6
- *Orientations, semiorders, arrangements, and parking functions*, Reed College Mathematics Colloquium, September 8
- Participant in “Sage Education Days 3,” University of Washington, June 16–18
- Authored the Sage sandpiles package—an official part of the mathematical software, Sage, starting with Sage version 4.7
- *Some Algebraic Geometry of the Abelian Sandpile Model*, Combinatorics Seminar, University of Minnesota, Minneapolis, March 25
- *Sandpiles, domino tilings, and Chebyshev polynomials*, Invited Paper Session on *Laplacian Growth: Visual Mathematics*, Joint Mathematics Meeting, New Orleans, January 6

**2010**

- *Some Algebraic Geometry of the Abelian Sandpile Model*, MIT Combinatorics Seminar, Massachusetts Institute of Technology, October 20
- *Domino Tilings and Sandpiles*, invited keynote address for the Northwest Undergraduate Mathematics Symposium at Oregon State University, April 24
- *The Algebraic Geometry of the Abelian Sandpile Model*, Mathematics colloquium lecturer at Oregon State University, April 23
- *The Abelian Sandpile Model*, Willamette University, April 1
- Referee for the *Journal of Combinatorial Theory, Series A*

**2009**

- *Sandpiles and Tilings*, Pacific University, October 5
- *Sandpiles and Tilings*, University of Puget Sound Mathematics and Computer Science Department Seminar Series, September 14
- Organizer for Math Circles event at Math Fest, Portland, Oregon, August
- Participant in “Sage Days 15,” University of Washington, May 16–21
- Google Summer of Code mentor for Reed College student Bryan Head;
- *Sandpiles and Tilings*, Reed College Mathematics Colloquium, April 2
- Co-adviser with Francis Su for Harvey Mudd mathematics senior, Natalie Durgin, 2008–2009
- NFS-STEM presentation at Reed College
- Reviewed *Analysis with an introduction to proof*, by Stephen Lay, for Pearson, June

**2008**

- Instructor for a course on algebraic geometry at the Park City Mathematics Institute, July 6–26

*Other*

- Organizer for the Reed College Mathematics Colloquium, 2000–2011, 2012–14, 2016–17, 2019–20
- Chair, Reed College Mathematics Department, 2015–2018
- Main developer of the packages for the [abelian sandpile model](#) and for [hyperplane arrangements](#) in the mathematical software system, Sage.
- Co-organizer for Humanities 411, Senior Symposium, Fall 2010, Fall 2012, Fall 2013
- Organizer for the Putnam Mathematical Competition practice sessions, Fall 2008 and 2009
- Member of CoCoA team (*Computations in Commutative Algebra*) 1997–2010;  
<http://cocoa.dima.unige.it/>
- AMS Mathematical Reviews, 1992–present
- Organized Reed College concerts by Zimbabwean mbira players James Mujuru, February 28, 2009, and Musekiwa Chingodza, August 2016

**Teaching**

- Over 30 years of teaching experience. Courses include: calculus, multivariable calculus, discrete structures, linear algebra, abstract algebra, real analysis, complex analysis, numerical analysis, manifolds, introductory combinatorics, combinatorial optimization, hyperplane arrangements, polytopes, generatingfunctionology, algebraic geometry, computational commutative algebra, algebraic number theory, ordinary differential equations, introductory statistics, numerical analysis, theory of computation.
- Advised approximately 50 undergraduate theses.