

Wesley Pegden

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CURRENT POSITION **Carnegie Mellon University, Pittsburgh, PA**

Associate Professor, 2017–present
Assistant Professor, 2013–2017

POSTDOCTORAL **Courant Institute, New York, NY**

NSF Postdoctoral Fellow, 2010–2013

EDUCATION **Rutgers University, New Brunswick, NJ**

Ph.D., May 2010.
Advisor: József Beck
Thesis: “Graphs, games and geometry”.

Budapest Semesters in Mathematics, Budapest, Hungary: 2004–2005

University of Chicago: 2001–2004.

BA in Mathematics, with Honors.

GRANTS,
FELLOWSHIPS, AND
AWARDS

Kavli Fellow
NSF Grant DMS-1700365 (2017–2020)
Sloan Fellowship (2016–2018)
NSF Grant DMS-1363136 (2014–2017)
NSF Postdoctoral Research Fellowship (2010–2013)
Torrey Fellow (Rutgers, 2005–2007)

PUBLICATIONS

Assessing significance in a Markov chain without mixing, with M. Chikina and A. Frieze.
Proceedings of the National Academy of Sciences **114** (2017) 2860–2864.

Looking for vertex number one, with A. Frieze.
Annals of Applied Probability **27** (2017) 582–630.

The Apollonian structure of integer superharmonic matrices, with L. Levine and C. Smart.
Annals of Mathematics **186** (2017) 1–67.

Traveling in randomly embedded random graphs, with A. Frieze.
RANDOM 2017. Preprint at <http://arxiv.org/abs/1411.6596>

Apollonian structure in the Abelian Sandpile, with L. Levine and C. Smart.
GAFAP **26** (2016) 306–336.

Separating subadditive Euclidean functionals, with A. Frieze.
STOC 2016. Journal version is *Random Structures & Algorithms* **51** (2017) 375–403.

Between 2- and 3-colorability, with A. Frieze.
Electronic Journal of Combinatorics **22** #P1.34 (2015).

Walker-Breaker games, with L. Espig, A. Frieze, and M. Krivelevich.
SIAM J. Discrete Math. **29** (2015).

The topology of competitively constructed graphs, with A. Frieze.
The Electronic Journal of Combinatorics **21** #P2.26.

Convergence of the Abelian Sandpile, with Charles K. Smart.
Duke Mathematical Journal **162** (2013) 627–642.

An extension of the Moser-Tardos algorithmic Local Lemma.
SIAM J. Discrete Math. **28** (2014)

Critical graphs without triangles: an optimum density construction.
Combinatorica **33** (2013) 495–512

The Lefthanded Local Lemma characterizes chordal dependency graphs.
Random Structures & Algorithms **41** (2012) 546–556

Highly nonrepetitive sequences: winning strategies from the Local Lemma.
Random Structures & Algorithms **38** (2011)

Sets resilient to erosion.
Advances in Geometry **11** (2011) 201–224.

The Hales-Jewett number is exponential, with J. Beck and S. Vijay.
Analytic Number Theory: Essays in Honour of Klaus Roth (Eds: W.W.L. Chen, W.T. Gowers, H. Halberstam, W.M. Schmidt, R.C. Vaughan), Cambridge University Press 2009.

A finite goal set in the plane which is not a winner.
Discrete Mathematics **308** (2008) 6546–6551.

Distance Sequences in Locally Infinite Vertex-Transitive Digraphs.
Combinatorica **26** (2006) 577–585.

PREPRINTS

A partisan districting protocol with provably nonpartisan outcomes, with A. D. Procaccia, D. Yu.
Submitted. Preprint at <https://arxiv.org/abs/1710.08781>.

Stability of patterns in the Abelian sandpile, with C. Smart.
Submitted. Preprint at <https://arxiv.org/abs/1708.09432>.

Online purchasing under uncertainty, with A. Frieze.
Random Structures & Algorithms (Accepted). Preprint at <http://arxiv.org/abs/1605.06072>

Diffusion limited aggregation in the Boolean lattice, with A. Frieze.
Submitted. Preprint at <https://arxiv.org/abs/1705.00692>.

Constraining the clustering transition for colorings of sparse random graphs, with M. Anastos, A. Frieze.
Submitted. Preprint at <https://arxiv.org/abs/1705.07944>

Minors of a random binary matroid, with C. Cooper and A. Frieze.

Submitted. Preprint at <https://arxiv.org/abs/1612.02084>

On the distribution of the minimum weight clique, with A. Frieze and G. Sorkin.
Submitted. Preprint at <http://arxiv.org/abs/1606.04925>

Scalefree hardness of average-case Euclidean TSP approximation, with A. Frieze.
Submitted. Preprint at <http://arxiv.org/abs/1604.04549>

COVERAGE IN
POPULAR MEDIA

The amazing, autotuning sandpile. Article in *Nautilus* magazine (2015) by J. Ellenberg.
<http://nautil.us/issue/23/dominoes/the-amazing-autotuning-sandpile>.

Das Wahnsinnsamt, Sandhäufchen und Apollonische Dreiecke. Article in *Spektrum der Wissenschaft* (German-language edition of Scientific American) by C. Pöppe, pages 67–71, August 2015.

Piling on and on and on... Article and podcast interview by M. Breen, at <http://www.ams.org/samplings/mathmoments/mm117-sandpiles-podcast> (2015).

On sandpiles. Coverage in *AMS Math in the media* column, by Allyn Jackson (April 2015).

Math and the gerrymander. Coverage in *AMS Math in the media* column, by Tony Phillips (March 2017).

Study: Math proves Pennsylvania's congressional districts 'almost certainly' gerrymandered. Story in *Philly Voice* by Daniel Craig (March 1, 2017).

Where Allegheny County's Harrisburg delegation stands on redistricting reform. Story in *The Incline* by Sarah Anne Hughes (March 23, 2017).

Groups sue Pennsylvania over congressional district map, citing gerrymandering. Story in the *Pittsburgh Post-Gazette* by Chris Potter (June 15, 2017).

Cake-cutting game theory trick could stop gerrymandering. Story in the *New Scientist* by Timothy Revell (November 1, 2017).

Top 100 Science stories of 2017 (**#17: fighting politics with math**). *Discover Magazine*, by Stephen Ornes, January-February 2018 issue.

TALKS

[*Colloquium*] University of Wisconsin, February 9 2018.

[*Colloquium*] University of Toronto, January 17 2018.

[*Colloquium*] Duke University, January 11 2018.

Ohio State Discrete Math Seminar, April 20, 2017, at Ohio State University.

Atlanta Lecture Series in Combinatorics and Graph Theory XVIII, October 22-23, 2016, at Emory University.

Princeton Discrete Mathematics Seminar, October 13, 2016, at Princeton University.

[*Conference*]*STOC 2016*, June 19 2016, in Boston, MA.

Princeton Discrete Mathematics Seminar, March 10, 2016, at Princeton University.

University of Chicago Theory Seminar, October 20, 2015 at the University of Chicago.

CMU CS Theory Seminar, May 14, 2015.

[*Colloquium*] University of Geneva, March 5 2015.

Ohio State Discrete Math Seminar, November 6 2014, at Ohio State University.

[*Conference*] *SIAM DM14, Special Session on Combinatorics and Statistical Mechanics*, June 18 2014 in Minneapolis, MN (2 talks)

Princeton Discrete Math Seminar, March 13 2014, at Princeton University.

AIM workshop: Generalizations of chip-firing and the critical group, July 2013 at AIM.

[*Conference*] *Special Session on Combinatorics and Classical Integrability* at the AMS Spring Eastern Sectional Meeting, April, 2013 at Boston College.

[*Colloquium*] University of Illinois at Urbana-Champaign, January 30, 2013.

[*Colloquium*] CMU, January 16, 2013.

[*Colloquium*] University of Illinois at Chicago, December 5, 2012.

Cornell Workshop on Sandpiles and Number Theory, October 2012 at Cornell University in Ithaca, NY.

MIT Combinatorics Seminar, April 27, 2012, at MIT.

UPenn seminar on Combinatorics and Probability, February 21, 2012, at the University of Pennsylvania.

Rutgers Discrete Math Seminar, February 7, 2012, at Rutgers University in New Brunswick.

Princeton Discrete Math Seminar, September 27, 2012 at Princeton University.

Probabilistic Combinatorics Mini-symposium of SIAM DM12, June 19, 2012 in Halifax, Nova Scotia.

[*Conference*] *the 15th conference on Random Structures & Algorithms*, May 24, 2012, at Emory University.

Columbia Discrete Math Seminar, February 14, 2012 at Columbia University in New York, NY.

Rutgers Discrete Math Seminar, February 1, 2011 at Rutgers University in New Brunswick.

New York Number Theory Seminar, November 4, 2010.

Columbia Discrete Math Seminar, October 27, 2009 at Columbia University in New York, NY.

Princeton Discrete Math Seminar, October 22, 2009 at Princeton University.

The 14th International Conference on Random Structures and Algorithms, in Poznań, Poland, August 2009.

[*Conference*] *Special Session on Probabilistic and Extremal Combinatorics*, at the 2009 AMS Spring Sectional Meeting, UIUC in Urbana-Champaign, IL.

Rutgers Discrete Mathematics Seminar, April 28 at Rutgers University in New Brunswick.

[*Conference*] *National AMS meeting*, in Washington, DC, January 2009.

Rutgers Experimental Mathematics Seminar, February 7 at Rutgers University in New Brunswick.

Princeton Discrete Mathematics Seminar, in December 2007 at Princeton University.

[*Conference*] *Workshop on Extremal Combinatorics*, Alfred Renyi Institute of Mathematics, in Budapest, Hungary, June 2007.