

## Wesley Pegden

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CONTACT INFORMATION Department of Mathematical Sciences office: 412 268 9782  
Carnegie Mellon University cell: 412 708 3772  
Pittsburgh, PA 15217 wes@math.cmu.edu  
<http://math.cmu.edu/~wes>

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

Professor, 2023–present  
Associate Professor, 2017–2023  
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 National Academy of Science Kavli Fellow  
NSF Grant DMS-2054503 (2021–2025)  
NSF Grant DMS-1700365 (2017–2021)  
Sloan Fellowship (2016–2018)  
NSF Grant DMS-1363136 (2014–2017)  
NSF Postdoctoral Research Fellowship (2010–2013)  
Torrey Fellow (Rutgers, 2005–2007)

ORGANIZATION AND SERVICE (2021-2023) Lead Organizer, Fall 2023 Semester on Algorithms and Fairness at MSRI.

(2018-2022) Program committee member for Frontiers of Science trilateral meetings organized by National Academy of Science (U.S.), the Alexander von Humboldt Foundation (Germany), and the Japan Society for the Promotion of Science (Japan).

(2018-2019) Member of the Pennsylvania Redistricting Reform Commission, (appointed by the Governor of Pennsylvania)

(2022-2023) Organizer, Random Structures & Algorithms Conference, Pittsburgh

(2005) Organizer, Random Structures & Algorithms Conference, Pittsburgh

EXPERT TESTIMONY (2017) *League of Women Voters v. Commonwealth of Pennsylvania*  
(2018) *Common Cause v. Lewis*  
(2022) *Haper v. Hall*

PH.D STUDENTS Joseph Briggs (Ph.D 2018, currently Assistant Professor at Auburn University)  
Anish Sevekari (Ph.D in 2023), went on to post-doctoral fellowship in department of  
Computational and Systems Biology, University of Pittsburgh

UNDERGRADUATE RESEARCH STUDENTS Jeremy Meza (PhD program, Berkeley Math)  
Sam Simon (PhD program, Simon Fraser University Math)  
Manuel Fernandez (PhD program, Georgia Tech ACO)  
Calvin Beideman (PhD Program, University of Illinois at Urbana Champaign)  
Matt Bowen (PhD Program, McGill University)  
Alp Müyesser (PhD Program, University College London)  
Rebecca (Meilum) Yang (Industry)  
Alexandra van Praag (Industry)  
Michael Liang (Industry)  
Katalin Berlow (PhD program, Berkeley Math)  
Eric Wang (still at CMU)  
Francesca Yu (still at CMU)

PUBLICATIONS Youden's Demon is Sylvesters problem, with F. Frick, A. Newman, to appear in  
*Mathematika* (2025).

Sampling balanced forests of grids in polynomial time, with S. Cannon, J. Tucker-Foltz,  
*STOC 2024* (2024)

The bright side of simple heuristics for the TSP, with A. Frieze,  
*Electronic Journal on Combinatorics* (2024).

Unit sphere fibrations in Euclidean space, with D. Asimov, F. Frick, M. Harrison,  
*Proceedings of the Edinburgh Mathematical Society* (2024)

On the intersecting family process, with A. Frieze, P. Bennett, A. Newman,  
*The Electronic Journal of Combinatorics* (2024)

Subexponential mixing for partition chains on grid-like graphs, with A. Frieze  
*Proceedings of the 2023 Annual ACM-SIAM Symposium on Discrete Algorithms* (2023)

Multitrees in random graphs, with A. Frieze  
*Electronic Journal of Combinatorics* (2023) .

Spanners in randomly weighted graphs: Euclidean case, with A. Frieze  
*Journal of Graph Theory* (2023)

On the cover time of the emerging giant, with A. Frieze, T. Tkocz  
*SIAM Journal on Discrete Mathematics* (2022).

Spanners in randomly weighted graphs: independent edge lengths, with A. Frieze,  
in *Discrete Applied Mathematics* **309** (2022) 68-74

Individual variation in susceptibility or exposure to SARS-CoV-2 lowers the herd im-  
munity threshold, with M.G.M. Gomes, M.U. Ferreira, R.M. Corder, J.G. King, C  
Souto-Maior, C. Penha-Goncalfes, G. Goncalves, M. Chikina, R. Aguas, in *Journal of*  
*theoretical biology* **540** (2022).

Maker Breaker on digraphs, with A. Frieze,

in *Journal of Graph Theory* **98** (2021) 653-661

Random volumes in d-dimensional polytopes, with A. Frieze, T. Tkocz,  
in *Discrete Analysis* 2020:15

Stability of patterns in the Abelian sandpile, with C. Smart.  
*Annales Henri Poincaré* **21** (2020), pages 1383–1399.

Semi-bandit optimization in the dispersed setting, with M.F. Balcan, and T. Dick,  
in *Conference on Uncertainty in Artificial Intelligence* (2020) 909-918

Separating effect from significance in Markov chain tests, with M. Chikina, A. Frieze,  
J. Mattingly.  
in *Statistics and Public Policy* **7** (2020) 101-114.

On random multi-dimensional assignment problems, with A. Frieze, T. Tkocz  
in *Discrete Applied Mathematics*, **287** (2020) 1-9.

Modeling strict age-targeted mitigation strategies for COVID-19, with M. Chikina,  
in *PloS One* **15** (2020), e0236237

Diffusion limited aggregation on the Boolean lattice, with A. Frieze.  
*Annals of Applied Probability* **28** (2018), 3528-3557.

A note on the localization number of random graphs: diameter two case, with A. Frieze,  
A. Dudek.  
*Discrete Applied Mathematics* **254** (2019), 107-112.

On the rank of a random binary matrix, with A. Frieze, C. Cooper.  
*Proceedings of SODA 2019*.

Minors of a random binary matroid, with C. Cooper and A. Frieze.  
*Random Structures & Algorithms* **55** (2019) 565-880.

A note on dispersing particles on a line, with A. Frieze.  
*Random Structures & Algorithms* **53** (2018) 586-591.

On the distribution of the minimum weight clique, with A. Frieze, G. Sorkin  
*SIAM Journal on Discrete Mathematics* **32**, 2115-2133.

Online purchasing under uncertainty, with A. Frieze.  
*Random Structures & Algorithms* **53** (2018).

Constraining the clustering transition for colorings of sparse random graphs, with  
M. Anastos, A. Frieze.  
*Electronic Journal of Combinatorics* **25** (2018)

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.  
*GAFa* **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.

SUPREME COURT  
AMICUS BRIEFS

*Rucho v. Common Cause*

*Gill v. Whitford*

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.

Gerrymandering, or Geography? Column in *the Atlantic* by Sam Wang (March 26, 2019).

NC Supreme Court strikes down GOP redistricting plans; Lawmakers have 2 weeks to draw new maps. Story in *WUNC* (North Carolina Public Radio) by Rusty Jacobs (February 4, 2022).

TALKS

[*Colloquium*], University of Rochester, Probability and statistics for partitioning problems arising in political redistricting, April 4, 2024.

*Recent Advances and Future Directions for Sampling* (Yale), Probability Spaces Driven By Geometric Constraints, Oct 17, 2024

*UC Berkeley Probability Seminar*, Probability spaces driven by geometric constraints, Sep 27, 2023

*MSRI/SLmath conference*, Probability spaces driven by geometric constraints, Oct 23, 2023

*AMS Sectional meeting*, Direct sampling of short paths for contiguous partitioning, Mar 18, 2023

*Purdue University Computer Science Seminar*, Markov chains and sampling methods

for contiguous partitions, Dec 7, 2022.

*Ohio State University Mathematics Seminar*, Markov chains and sampling methods for contiguous partitions, Oct 20, 2022.

*Georgia Tech Mathematics Seminar*, Subexponential mixing for partition chains, Nov 18, 2022

*Duke Mathematics Seminar*, Markov chains and sampling methods for contiguous partitions, Oct 17, 2022

*Random Structures & Algorithms conference*, Subexponential mixing for partition chains, 8/4/2022, Poland

*Panel* Duke University, invited panel member at conference “Redistricting and American Democracy”, Sep 28-29

[*Colloquium*] Georgia Tech School of Mathematics, February 18 2021

*UBC Math Bio Seminar*, UBC, April 22, 2020

*Random Discrete Structures Workshop* at AMS sectional meeting in Boston, March 21-22 2020 [cancelled]

*Random Discrete Structures Workshop* at SIAM DM 2020 in Portland, June 1-4 2020 [cancelled]

*MSRI Workshop* on Today’s Mathematics, Social Justice, and Implications for Schools, at MSRI, March 13, 2020.

*Social Science Applications Forum*, Center of Mathematical Sciences and Applications, Harvard University, March 11, 2019.

*The Statistical and Applied Mathematical Sciences Institute at Duke University*, October 8 2018.

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

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

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

*SIAM annual meeting*, Random Structures mini-session, April 20, 2017.

*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.