

Michael Damron

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Education

Ph.D. Mathematics, New York University, 2009.

Advisor: Charles Newman and Daniel Stein

B.S.E. Computer Engineering, B.S. Mathematics, University of Florida, 2004.

Employment

Georgia Institute of Technology

Associate Professor, 2017-

Assistant Professor, 2015-2017

Indiana University, Bloomington

Assistant Professor, 2013-2016

Princeton University

Instructor, 2010-2013

NSF Postdoctoral Research Fellow, 2009-2012

Awards and honors

Research

Kavli fellow (National Academy of Science), 2019

NSF CAREER grant 1552267 (\$400,000) "Distances in random media," 2016-2021

NSF grant 1419230 (\$145,000) "Random spatial systems and ground states of short range spin glasses," 2013-2016

NSF Postdoctoral Research Fellowship, 2009-2012

Wilhelm Magnus memorial prize, NYU, 2009

for significant contributions to the mathematical sciences

Conference grants

(with C. Houdré) IMA participating institutions conference grant (\$5,000), 2018

(with R. Lyons) NSF grant 1503743 (\$15,000) "Seymour Sherman memorial conference," 2015

Teaching

LexisNexis Dean's award, Georgia Tech, 2016

Trustees teaching award, IU, 2013-2014

First time awarded to a first-year faculty

Outstanding teaching assistant award, NYU, 2009, university-wide award

Publications

Books

(edited with F. Rassoul-Agha and T. Seppäläinen) Random growth models. *AMS Proceedings of the 2017 Joint Math Meetings Short Course*.

(with A. Auffinger and J. Hanson) 50 years of first-passage percolation. *AMS University Lecture Series. Vol. 68*.

Preprints/In progress

(with D. Harper) Nonoptimality of invaded geodesics in $2D$ critical first-passage percolation. *arXiv: 1912.06714*

(with J. Hanson and W.-K. Lam) Universality for the time constant in $2D$ critical first-passage percolation. *arXiv: 1904.12009*

(with B. Bock) The acceptance profile of invasion percolation at p_c in two dimensions. *arXiv: 1904.08893*

(with J. Fickenscher) The number of ergodic measures for transitive shifts with the regular bispecial condition. *arXiv: 1902.04619*

(with M. Bernstein and T. Greenwood) Sublinear variance in Euclidean first-passage percolation. *arXiv: 1901.10325*

(with B. Bock, C. Newman, and V. Sidoravicius) Percolation of finite clusters and infinite shielded paths. *arXiv: 1811.01678*

Recent work on chemical distance in critical percolation. *arXiv: 1602.00775*

(with J. Hanson and P. Sosoe) On the chemical distance in critical percolation II. *arXiv: 1601.03464*

Journal publications

(with A. Sen) Zero-temperature Glauber dynamics on the 3-regular tree and the median process. *To appear in Probab. Theory Relat. Fields*.

(with J. Hanson and P. Sosoe) Strict inequality for the chemical distance exponent in two-dimensional critical percolation. *To appear in Comm. Pure Appl. Math*.

(with J. Hanson, C. Houdré, and C. Xu) Lower bounds for fluctuations in first-passage percolation for general distributions. *To appear in Ann. Inst. H. Poincaré Probab. Statist*.

(with P. Tang) Superlinearity of geodesic length in $2D$ critical first-passage percolation. *To appear in Festschrift for C. Newman*.

- (with J. Gravner, H. Lyu, M. Junge, and D. Sivakoff) Parking on transitive unimodular graphs. *To appear in Ann. Appl. Probab.*
- (with J. Hanson and P. Sosoë) Arm events in two-dimensional invasion percolation. *J. Stat. Phys.* **173**, no. 5 (2018), 1321–1352.
- (with D. Sivakoff and L. Petrov) Coarsening model on \mathbb{Z}^d with biased zero-energy flips and an exponential large deviation bound for ASEP. *Commun. Math. Phys.* **362**, no. 1 (2018), 185–217.
- (with J. Hanson and W.-K. Lam) The size of the boundary in first-passage percolation. *Ann. Appl. Probab.* **28**, no. 5 (2018), 3184–3214.
- (with J. Hanson and P. Sosoë) On the chemical distance in critical percolation. *Electron. J. Probab.*, paper 75.
- (with J. Hanson) Bigeodesics in first-passage percolation. *Commun. Math. Phys.* **349**, no. 2 (2017), 753–776.
- (with X. Wang) Entropy reduction in Euclidean first-passage percolation. *Electron. J. Probab.* **21**, no. 65 (2016), 1–23.
- (with W.-K. Lam and X. Wang) Asymptotics for critical 2D first-passage percolation. *Ann. Probab.* **45**, no. 5 (2016), 2941–2970.
- (with N. Kubota) Rate of convergence in first-passage percolation under low moments. *Stoch. Proc. Appl.* **126**, no. 10 (2016), 3065–3076.
- (with H. Kogan, C. Newman, and V. Sidoravicius) Coarsening with a frozen vertex. *Electron. Commun. Probab.* **21**, no. 9 (2016), 1–4.
- (with D. Ahlberg and V. Sidoravicius) Inhomogeneous first-passage percolation. *Electron. J. Probab.* **21**, no. 4 (2016), 1–19.
- (with J. Fickenscher) On the number of ergodic measures for subshifts of eventually constant complexity growth. *To appear in Ergodic Theory Dynam. Systems.*
- (with S. Eckner, H. Kogan, C. Newman and V. Sidoravicius) Coarsening dynamics on \mathbb{Z}^d with frozen vertices. *J. Stat. Phys.* **160**, no.1 (2015), 60–72.
- (with A. Auffinger and J. Hanson) Rate of convergence of the mean for sub-additive ergodic sequences. *Adv. Math.* **285** (2015), 138–181.
- (with J. Hanson and P. Sosoë) Subdiffusive concentration in first-passage percolation. *Electron. J. Probab.* **19**, no. 109 (2014), 1–27.
- (with J. Hanson and P. Sosoë) Sublinear variance in first-passage percolation for general distributions. *To appear in Probab. Theory Relat. Fields.*
- (with C. Newman and V. Sidoravicius) Absence of site percolation at criticality in $\mathbb{Z}^2 \times \{0, 1\}$. *Random Struct. Alg.* **47** (2015), 328–340.
- (with H. Kogan, C. Newman and V. Sidoravicius) Fixation for coarsening dynamics in 2D slabs. *Electron. J. Probab.* **18**, no. 105 (2013), 1–20.
- (with A. Auffinger and J. Hanson) Limiting geodesics for first-passage percolation on subsets of \mathbb{Z}^2 . *Ann. Appl. Probab.* **25** (2015), 373–405.

(with H. Kogan, C. Newman and V. Sidoravicius) Coarsening in 2D slabs. In *Percolative and Disordered Systems*, Springer.

(with J. Hanson and P. Sosoe) Subdiffusivity of random walk on the 2D invasion percolation cluster. *Stoch. Proc. Appl.* **123** (2013), 3588-3621.

(with J. Hanson) Busemann functions and infinite geodesics in two-dimensional first-passage percolation. *Commun. Math. Phys.* **325** (2014), 917-963.

(with A. Auffinger) A simplified proof of the relation between scaling exponents in first-passage percolation. *Ann. Probab.* **42** (2014), 1197-1211.

(with A. Auffinger) The scaling relation $\chi = 2\zeta - 1$ for directed polymers in a random environment. *ALEA*. **10** (2013), 857-880.

(with L.-P. Arguin) On the number of ground states for the Edwards-Anderson spin glass model. *Ann. Inst. H. Poincaré Probab. Statist.* **50** (2014), 28-62.

(with A. Auffinger) Differentiability at the edge of the percolation cone and related results in first-passage percolation. *Probab. Theory Relat. Fields.* **156** (2013), 193-227.

(with L.-P. Arguin) Short-range spin glasses and Random Overlap Structures. *J. Stat. Phys.* **143** (2011), 226-250.

(with M. Hochman) Examples of non-polygonal limit shapes in i.i.d. first-passage percolation and infinite coexistence in spatial growth models. *Ann. Appl. Probab.* **23** (2013), 1074-1085.

(with A. Sapozhnikov) Limit theorems for 2d invasion percolation. *Ann. Probab.* **40** (2012), 893-920.

(with L.-P. Arguin, C. Newman and D. Stein) Uniqueness of ground states for short-range spin glasses in the half-plane. *Commun. Math. Phys.* **300** (2010), 641-657.

(with A. Sapozhnikov) Outlets of 2d invasion percolation and multiple-armed incipient infinite clusters. *Probab. Theory Relat. Fields* **150** (2011), 257-294.

(with A. Sapozhnikov and B. Vágvölgyi) Relations between invasion percolation and critical percolation in two dimensions. *Ann. Probab.* **37** (2009), 2297-2331.

(with C.L. Winter) A non-Markovian model of rill erosion. *Netw. Heterog. Media* **4** (2009), 731-753.

Invited courses

(Oct. 2020) Introduction to percolation models, Havana, Cuba (EMALCA) — 5-part course on percolation and growth models

(Jun. 2020) Conference on first-passage percolation and growth models, Bengaluru, India — 3-part course on geodesics in first-passage percolation

(July 2018) Challenges in Probability and Mathematical Physics, Université de Montreal — part 1 of 3-part series on first-passage percolation

(Jan. 2017) AMS Joint Math Meetings Short Course, Atlanta — 2 parts of 7-part course on random growth models

(Dec. 2016) School on information and randomness, University of Chile — 4-part course on geodesics in first-passage percolation

(Jul. 2016) Summer school in probability, Northwestern University — 5-part course on geodesics in first-passage percolation

(Jun. 2016) School and workshop on random interacting systems, University of Bath – 5-part course on geodesics in first-passage percolation

(Nov. 2009) Statistical mechanics on random structures, Banff — part of 3-part course on ground states in the EA spin glass

(Aug. 2009) Order, disorder and double disorder, EURANDOM — part of 3-part course on ground states in the EA spin glass

Invited conference talks / colloquia

(Apr. 2020) Stochastic Spatial Processes, Ohio State University

(Apr. 2020) AMS sectional meeting, Purdue University

(Oct. 2019) AMS sectional meeting, Binghamton University

(July 2019) Stochastic processes and their applications conference, percolation session

(Mar. 2019) AMS sectional meeting, Auburn University

(Mar. 2019) Conference in interacting particle systems in honor of Tom Liggett, IPAM, UCLA

(Oct. 2017) Department Colloquium, UCLA

(May 2017) Southeastern Probability Conference, Duke University

(Oct. 2016) Department Colloquium, Iowa State University

(Sep. 2016) Workshop on random growth problems and random matrices, CRM Montreal

(Apr. 2016) AMS sectional meeting, North Dakota State University

(Apr. 2016) Department Colloquium, Rice University

(Mar. 2016) AMS sectional meeting, University of Georgia

(Mar. 2016) International conference on probability theory and statistical physics, NYU Shanghai

(Dec. 2015) Canadian mathematical society, special session

(Nov. 2015) AMS sectional meeting, Rutgers University

(Sep. 2015) Department Colloquium, University of Alabama, Birmingham

(July 2015) ICMP thematic session in probability, Santiago, Chile

(Mar. 2015) Department Colloquium, University of Cincinnati

(Jan. 2015) Department Colloquium, Georgia Institute of Technology

(May 2014) Frontier probability days (plenary lecture), University of Arizona

(July 2013) Disorder in statistical mechanics, NYU

(Mar. 2013) Toronto probability day, University of Toronto

- (May 2012) Advances in percolation and related topics, University of Michigan
- (Mar. 2012) Columbia-Princeton probability day, Columbia University
- (Feb. 2012) University of Delaware, Department colloquium
- (Jan. 2012) PASI school on probability and statistical mechanics, PUC, Santiago, Chile
- (Jan. 2012) Indiana University, Bloomington, Department colloquium
- (Jan. 2012) Ohio State University, Department colloquium
- (Jan. 2012) University of Oregon, Department colloquium
- (Oct. 2011) Johns Hopkins University, Applied math colloquium
- (Jul. 2011) Cornell probability summer school
- (Jan. 2011) Conference on probability theory, NYU Abu Dhabi
- (Aug. 2009) Scaling limits in statistical mechanics models, Oberwolfach
- (Apr. 2009) Workshop on percolation and related topics, Cornell University

Invited seminar talks

- (Nov. 2020) Probability and Analysis seminar, Northwestern University
- (Sep. 2020) Probability seminar, University of North Carolina, Chapel Hill
- (Apr. 2020) Probability seminar, Indiana University, Bloomington
- (Mar. 2020) Probability seminar, University of Illinois, Chicago
- (Feb. 2020) Probability seminar, University of Utah
- (Dec. 2019) Probability seminar, University of Rochester
- (Nov. 2019) Probability seminar, Temple/UPenn
- (Nov. 2019) Probability seminar, University of Stockholm
- (Apr. 2019) Analysis Seminar, Stonybrook University
- (Nov. 2018) Combinatorics seminar, Ohio State
- (Sep. 2018) Probability seminar, Cornell University
- (Nov. 2017) Probability seminar, CUNY
- (Oct. 2017) Probability seminar, UCLA
- (Apr. 2017) Probability seminar, Cornell University
- (Oct. 2016) Probability Seminar, Iowa State University
- (Oct. 2016) Random Matrix Theory Seminar, Harvard University

- (Feb. 2016) Probability seminar, University of Utah
- (Aug. 2015) Stochastics seminar, Georgia Institute of Technology
- (Mar. 2015) Analysis seminar, Northwestern University
- (Mar. 2015) Probability seminar, University of Cincinnati
- (Oct. 2014) Probability seminar, University of Colorado, Boulder
- (Oct. 2014) Probability seminar, Columbia University
- (Nov. 2013) Probability seminar, University of Utah
- (Oct. 2013) Probability and analysis seminar, Purdue University
- (Mar. 2013) Probability seminar, Michigan State University
- (Sep. 2012) Probability seminar, University of Illinois, Urbana-Champaign
- (Nov. 2012) Probability seminar, University of Wisconsin, Madison
- (Feb. 2012) Probability seminar, University of Delaware
- (Feb. 2012) Random matrix theory seminar, Harvard University
- (Dec. 2011) Probability and Mathematical Physics seminar, NYU
- (Dec. 2011) Probability and Mathematical Physics seminar, Princeton University and IAS
- (Dec. 2011) Probability seminar, University of Minnesota
- (Nov. 2011) Probability seminar, Université de Montreal
- (Sep. 2011) Analysis and Probability seminar, University of Connecticut
- (Oct. 2011) Probability seminar, University of Chicago
- (Sep. 2011) Probability seminar, Duke University
- (Oct. 2011) Probability and Discrete Math seminar, University of Pennsylvania
- (Mar. 2011) Probability seminar, Cornell University
- (Nov. 2010) Analysis and Mathematical Physics seminar, IAS
- (Feb. 2009) Probability seminar, Cornell University
- (Oct. 2008) Probability seminar, NYU
- (Sep. 2008) Probability seminar, Columbia University

Service

Conferences organized

(with G. Brito, R. Durrett, M. Junge, and D. Sivakoff) Mathematics Research Communities, Stochastic Spatial Models, AMS, 2019.

(with C. Houdré) Recent trends in continuous and discrete probability, Georgia Tech, 2018.

(coorganizer) Southeastern probability conference, Duke University, 2018.

(with R. Gong) AMS special session on random matrices, random percolation models, and random sequence comparison, AMS Joint Math Meetings, Jan. 2017

(with T. Seppäläinen and F. Rassoul-Agha) Random growth models, AMS Joint Math Meetings Short Course, Jan. 2017

(with A. Auffinger, J. Hanson) First-passage percolation and related models, AIM workshop, Aug. 2015

(with R. Lyons) Sherman memorial conference, IU, May 2015

(with D. Sivakoff) AMS special session on discrete stochastic models, MSU, Mar. 2015.

Department service

Undergraduate Committee 2018-2020

Junior promotion and tenure committee 2017-2021

Graduate Committee 2016-2018

Postdoc Committee 2017

Colloquium Committee 2015-2016

Editorial service

Refereed journal articles for:

Annals of Applied Probability, Annals of Mathematics, Annals of Probability, Annales de l'Institut Henri Poincaré, Communications in Mathematical Physics, Communications on Pure and Applied Mathematics, Electronic Journal of Probability, Journal of Statistical Physics, Inventiones Mathematicae, Statistics and Probability Letters

Reviewed articles for Mathscinet

Served on 4 NSF panels

Reviewed grants for CUNY, Dutch Research Council

Mentorship

Postdoctoral scholars mentored

A. Özdemir, GaTech, 2020-2022
Gerandy Brito, GaTech, 2017-2019
Jack Hanson, IU/GaTech, 2013-2015
Xuan Wang, IU/GaTech, 2014-2016

Ph. D. students

David Harper, GaTech, 2017-
Wai Kit Lam, IU, 2014-2018.
Bounghun Bock, IU/GaTech, 2014-2019

Undergraduate/High school service

Senior thesis projects:

Daniel Wu, Kamron Saniee, Princeton, Spring 2013
Steven Kim, Princeton, Spring 2013 (won PACM independent project prize)

REU projects / reading courses:

Ruihan Liu, Gatech, Spring 2020; Shenduo Zhang, GaTech, Fall 2019; Jaron Jackson, GaTech, Fall 2019; Yuyao Wang, GaTech, Spring 2018; Xiaomeng Wan, GaTech, Spring 2018; Thomas Koelle, GaTech, 2017.
George Kerchev, Princeton, Summer 2013; Daniel Penner, Princeton, Summer 2012
Michael Khanarian, NYU, Summer 2011; Scott Yang, NYU, Summer 2009.