Steven N. Karp

Curriculum Vitae

LaCIM, Université du Québec à Montréal   `karp.steven@courrier.uqam.ca`
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Research Interests

Combinatorics and its relations to algebra, geometry, topology, and physics.

Education

2017   Ph.D., Mathematics, University of California, Berkeley
       Dissertation: *Total positivity for Grassmannians and amplituhedra*
       Advisor: Lauren K. Williams
2012   M.A.St. (with Distinction), Mathematics, University of Cambridge
2011   BMath, Combinatorics & Optimization and Pure Mathematics, University of Waterloo

Employment

2019 –   Postdoctoral Fellow, LaCIM, Université du Québec à Montréal
2017 – 2021   Postdoctoral Assistant Professor, University of Michigan (on leave 2019 – 2021)

Awards

2019 – 2021   NSERC Postdoctoral Fellowship
2017 – 2019   AMS–Simons Travel Grant
2017   Ribet–Goldberg Award in Algebra, University of California, Berkeley
2014   Chateaubriand Fellowship
2012 – 2015   NSERC Postgraduate Scholarship
2011 – 2012   Studentship in Mathematics, Trinity College, Cambridge
2011 – 2012   Julie Payette–NSERC Research Scholarship
2011   Valedictorian, Faculty of Mathematics, University of Waterloo
2011   Mike Vangoch Memorial Scholarship, University of Waterloo
2010   NSERC–CMS Math in Moscow Scholarship
2009, 2010   Honorable Mention, William Lowell Putnam Mathematical Competition
2008, 2009   NSERC Undergraduate Student Research Assistantship
2007 – 2011   R.G. Stanton National Scholarship, University of Waterloo
2007   Bronze Medal, International Mathematical Olympiad

Publications and Preprints

11. Wronskians, total positivity, and real Schubert calculus.
    `arXiv:2110.02301`

10. (with Anthony M. Bloch) Gradient flows, adjoint orbits, and the topology of totally nonnegative flag varieties.
    `arXiv:2109.04558`

 9. (with John Machacek) Shelling the $m = 1$ amplituhedron.
    `arXiv:2104.02786`

 8. (with Pavel Galashin and Thomas Lam) Regularity theorem for totally nonnegative flag varieties.
    J. Amer. Math. Soc. 35 (2022), no. 2, 513–579. `arXiv:1904.00527`

 7. Moment curves and cyclic symmetry for positive Grassmannians.
    Bull. Lond. Math. Soc. 51 (2019), no. 5, 900–916. `arXiv:1805.06004`

 6. (with Pavel Galashin and Thomas Lam) The totally nonnegative part of G/P is a ball.
    Adv. Math. 351 (2019), 614–620. `arXiv:1801.08953`

 5. (with Lauren K. Williams and Yan X Zhang) Decompositions of amplituhedra. Appendix written with Hugh Thomas.
    Ann. Inst. Henri Poincaré D 7 (2020), no. 3, 303–363. `arXiv:1708.09525`

 4. (with Pavel Galashin and Thomas Lam) The totally nonnegative Grassmannian is a ball.
    Adv. Math. 397 (2022), Paper No. 108123, 23 pp. `arXiv:1707.02010`

 3. (with Lauren K. Williams) The $m = 1$ amplituhedron and cyclic hyperplane arrangements.
    Int. Math. Res. Not. IMRN (2019), no. 5, 1401–1462. `arXiv:1608.08288`

 2. Sign variation, the Grassmannian, and total positivity.
    J. Combin. Theory Ser. A 145 (2017), 308–339. `arXiv:1503.05622`

 1. (with R.P. Anstee) Forbidden Configurations: Exact bounds determined by critical substructures.
    Electron. J. Combin. 17 (2010), no. 1, Research Paper 50, 27 pp.

Conference and Seminar Talks

2021	12/09	Scattering amplitudes, cluster algebras, and positive geometries mini-workshop, Mathematisches Forschungsinstitut Oberwolfach
2021	12/03	CMS Winter Meeting scientific session on combinatorics and geometry of moduli of curves, online
2021	11/09	Combinatorics, physics and probability seminar, Center of Mathematical Sciences and Applications
2021	10/25	Algebra and combinatorics seminar, North Carolina State University
2021	10/08	Séminaire de combinatoire, LaCIM, Université du Québec à Montréal
2021	09/22	Algebraic geometry seminar, Washington University in St. Louis
2021	05/20	Algebraic and enumerative combinatorics seminar, University of Waterloo
2021	04/08	The amplituhedron: algebra, combinatorics, and physics, online
2021	01/24	Combinatorial Algebra meets Algebraic Combinatorics (CAAC), online
2020	10/03	AMS Sectional special session on cluster algebras and plabic graphs, online
2020	07/22	Formal Power Series and Algebraic Combinatorics conference (FPSAC), online

2020 03/09 Applied algebra seminar, York University
2020 03/07 Algebra, Geometry and Combinatorics Day (ALGECOM), University of Illinois at Urbana–Champaign
2020 01/10 Séminaire de combinatoire, LaCIM, Université du Québec à Montréal
2019 03/28 Geometry, combinatorics, and integrable systems seminar, Ohio State University
2018 11/30 Combinatorics seminar, Massachusetts Institute of Technology
2018 11/29 Discrete math seminar, University of Massachusetts Amherst
2018 10/21 AMS Sectional special session on cluster algebra, Poisson geometry, and related topics, University of Michigan
2018 07/19 Formal Power Series and Algebraic Combinatorics conference (FPSAC), Dartmouth College
2018 05/10 Cluster Algebras and Mathematical Physics conference, Michigan State University
2017 10/27 Combinatorics seminar, University of Michigan
2017 09/29 Combinatorics seminar, University of Minnesota, Twin Cities
2017 09/28 Student combinatorics seminar, University of Minnesota, Twin Cities
2017 07/09 Formal Power Series and Algebraic Combinatorics conference (FPSAC), Queen Mary University of London
2017 03/30 Algebra-geometry-combinatorics seminar, University of Illinois at Urbana–Champaign
2016 12/01 Combinatorics seminar, University of California, Los Angeles
2016 10/17 Discrete geometry and combinatorics seminar, Cornell University
2016 08/29 Combinatorics seminar, University of California, Berkeley
2016 04/22 Discrete math seminar, Texas State University
2016 02/19 Combinatorics seminar, University of Michigan
2015 07/07 Formal Power Series and Algebraic Combinatorics conference (FPSAC), Korea Advanced Institute of Science and Technology
2015 03/11 Algebra-geometry-combinatorics seminar, San Francisco State University
2015 02/09 Combinatorics seminar, University of California, Berkeley
2014 11/20 Séminaire de combinatoire, LIAFA, Université Paris Diderot

Conference Organization

2020 12/05 – 12/08 CMS Winter Meeting scientific session on enumerative combinatorics, online
2018 10/20 – 10/21 AMS Sectional special session on combinatorics in algebra and algebraic geometry, University of Michigan

Seminar Organization

Fall 2016 – Spring 2017 Combinatorics seminar, University of California, Berkeley
Spring 2014   Combinatorics student seminar, University of California, Berkeley

Spring 2013 – Fall 2013   Many Cheerful Facts seminar, University of California, Berkeley

Teaching

University of Michigan
    Winter 2019   Linear algebra (Math 217)
    Fall 2018   Linear algebra (Math 217), 2 sections
    Winter 2018   Algebraic combinatorics (Math 566)
    Fall 2017   Calculus I (Math 115), 2 sections

University of California, Berkeley (Graduate Student Instructor)
    Spring 2017   Calculus (Math 1B)
    Spring 2016   Multivariable calculus (Math 53)
    Fall 2015   Linear algebra (Math 110)
    Fall 2013   Multivariable calculus (Math 53)
    Spring 2013   Calculus (Math 1B)
    Fall 2012   Calculus (Math 1A)

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