

Curriculum Vitae

SEVAK MKRTCHYAN

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Employment

2020 –present Associate Professor, **University of Rochester**
2014 –2020 Assistant Professor, **University of Rochester**
2012 – 2014 Postdoctoral associate, **Carnegie Mellon University**
2012 Spring Postdoctoral Fellow, **Mathematical Sciences Research Institute (MSRI)**
2009 – 2012 G.C. Evans Instructor of Mathematics, **Rice University**

Long term visits

2017 Summer Park City Mathematical Institute - Random Matrices (3 weeks)
2015 Summer Galileo Galilei Institute - Statistical mechanics, integrability and combinatorics (3 weeks)
2015 Spring ICERM - Phase Transitions and Emergent Properties (1 semester)

Education

2004 – 2009 **University of California, Berkeley**, Ph.D. in Mathematics
Advisor: Nicolai Reshetikhin
2001 – 2004 **University of Pittsburgh**
2000 – 2001 **Moscow Institute of Physics and Technology**

Research interests

Integrable probability, determinantal point processes and random matrix theory, asymptotic representation theory and asymptotic combinatorics, geometric measure theory.

Publications and preprints

1. *The limit shape of the Leaky Abelian Sandpile model* (joint with I. Alevy), [arXiv:2010.01946](https://arxiv.org/abs/2010.01946) Submitted.
2. *Random gap processes and asymptotically complete sequences* (joint with E. Crossen Brown and J. Pakianathan), [arXiv:1909.08688](https://arxiv.org/abs/1909.08688) Submitted.
3. *Rigidity, graphs and Hausdorff dimension* (joint with N. Chatzikonstantinou, A. Iosevich and J. Pakianathan), [arXiv:1708.05919](https://arxiv.org/abs/1708.05919) Submitted.
4. *Turning point processes in plane partitions with periodic weights of arbitrary period*, [arXiv:1908.01246](https://arxiv.org/abs/1908.01246) Accepted to **Progress in Mathematics**.
5. *Existence of similar point configurations in thin subsets of \mathbb{R}^d* (joint with A. Greenleaf and A. Iosevich), [arXiv:1808.04290](https://arxiv.org/abs/1808.04290) Accepted to **Mathematische Zeitschrift**.
6. *GUE corners limit of q -distributed lozenge tilings* (joint with L. Petrov), [arXiv:1703.07503](https://arxiv.org/abs/1703.07503), **Electronic Journal of Probability**, Volume 22 (2017), paper no. 101, 24 pp..
7. *Symmetrizing Tableaux and the 5th case of the Foulkes Conjecture* (joint with M. Cheung, C. Ikenmeyer), **Journal of Symbolic Computation**, 80 (2017) 833–843.
8. *Plane partitions with two-periodic weights*, **Letters in Mathematical Physics**, 104(9):1053–1078, 2014.

9. *Entropy of Schur–Weyl measures*, **Annales de l’Institut Henri Poincaré**, 50(2):678-713, 2014.
10. *Entropy and the Shannon-McMillan-Breiman theorem for beta random matrix ensembles* (joint with A. Bufetov, M. Shcherbina and A. Soshnikov), **Journal of Statistical Physics**, 152(1):1-14, 2013.
11. *Asymptotics of the maximal and the typical dimensions of isotypic components of tensor representations of the symmetric group*, **European Journal of Combinatorics**, special issue “Groups, graphs, and languages.” 33(7):1631-1652, 2012.
12. *Scaling limits of random skew plane partitions with arbitrarily sloped back walls*, **Communications in Mathematical Physics**, 305(3):711–739, 2011.
13. *Random skew plane partitions with a piecewise periodic back wall* (joint with C. Boutillier, N. Reshetikhin and P. Tingley), **Annales Henri Poincaré**, 13(2):271–296, 2012.
14. *Scaling limits of random skew plane partitions*, Ph.D. Thesis, University of California, Berkeley, 2009.

Honors and awards

- 2020 – Summer CIMPA (France) Grant to organize a summer school on Finite point configurations and discrete integrable systems in July 2020 in Tsakhkadzor, Armenia (Co-organizer)
- 2017 – 2021 NSF Grant for the Finger Lakes Probability Seminar (Co-PI with Carl Mueller) # 1704163
- 2016 – 2021 Simons Foundation Grant # 422190
- 2014 Emil Artin Junior Prize in Mathematics
- 2013 – Spring MRC collaboration grant, AMS/NSF
- 2012 Mathematical Sciences Research Institute Postdoctoral Fellowship
- 2009 Outstanding Graduate Student Instructor Award, University of California, Berkeley
- 2001 – 2004 Chancellor’s Scholarship, University of Pittsburgh
- 2004 University Scholar, University of Pittsburgh
- 2002 – 2004 Mathematics Department Culver Prize, University of Pittsburgh in 2004, 2003, 2002
- 2002 – 2003 Second Prize (2003) and Honorable Mention (2002), William Lowell Putnam Competition
- 2000 Republic of Armenia Government Medal
- 2000 Gold Medal of Secondary General Education, Ministry of Education, Armenia
- 2000 Silver Medal at the 41st International Mathematical Olympiad in Taejon, South Korea
- 1999 Bronze Medal at the 40th International Mathematical Olympiad in Bucharest, Romania
- 1998 Bronze Medal at the 39th International Mathematical Olympiad in Taipeh, Taiwan

Invited lectures and presentations

- 2020 Mar. *AMS Sectional Meeting* (University of Virginia, Charlottesville, VA), Special Session on Integrable Probability (Cancelled)
- 2020 Feb. *Asymptotic Algebraic Combinatorics* (Institute for Pure and Applied Mathematics (IPAM))
- 2020 Jan. *AMS-MAA Joint Mathematics Meetings* (Denver), Special Session on Random matrices and integrable systems
- 2019 Oct. *AMS Sectional Meeting* (Binghamton University, Binghamton, NY), Special Session on Stochastic Evolution of Discrete Structures
- 2019 Sep. *School and Workshop on Random Matrix Theory and Point Processes* (Abdus Salam International Centre for Theoretical Physics, Trieste, Italy),
- 2019 Apr. *Eleventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena* (University of Georgia, Athens, GA), Special Session on Random Matrices, Painleve Equations, and Integrable Systems

- 2019 Mar. *Banff International Research Station, Banff, Canada*, Workshop on Asymptotic Algebraic Combinatorics
- 2018 Nov. *Cincinnati Symposium on Probability Theory and Applications* (University of Cincinnati),
- 2018 Oct. *Analysis Seminar*, KTH, The Royal Institute of Technology, Stockholm, Sweden
- 2018 Sep. *Applied Math Seminar*, Colorado State University
- 2018 Jun. *Representation theory, mathematical physics and integrable systems* (Luminy, Marseille, France),
- 2018 Jun. *Conference Dedicated to the Memory of Sergey Mergelyan* (Yerevan, Armenia),
- 2018 May. *Emil Artin International Conference* (Yerevan, Armenia),
- 2018 Apr. *AMS Sectional Meeting* (Vanderbilt University, Nashville, TN), Special Session on Probabilistic Models in Mathematical Physics
- 2018 Jan. *AMS-MAA Joint Mathematics Meetings* (San Diego), Special Session on Algebraic, Analytic, and Geometric Aspects of Integrable Systems, Painlevé Equations, and Random Matrices
- 2017 Jun. *Seminar of the AMU*, Yerevan State University
- 2017 May. *Seminar of the Institute of Mathematics*, National Academy of Sciences of Armenia
- 2017 May. *Ninth Annual Session of the Armenian Mathematical Union* (Yerevan State University, Yerevan, Armenia), Section B on Algebra, Discrete Mathematics, Probability Theory
- 2017 Mar. *Tenth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena* (University of Georgia, Athens, GA), Special Session on Painlevé Equations, Integrable Systems, and Random Matrices
- 2017 Mar. *Probability Seminar*, University of Virginia
- 2017 Jan. *Large random structures in two dimensions*, Institut Henri Poincaré, Paris, France
- 2016 Oct. *Probability Seminar*, University of Rochester
- 2015 Dec. *Probability Seminar*, University of Pennsylvania
- 2015 Oct. *Probability Seminar*, Cornell University
- 2015 Nov. *AMS Sectional Meeting* (Rutgers University, New Brunswick, NJ), Special Session on Probability, Combinatorics and Statistical Mechanics
- 2015 Jul. *Workshop on Group Representations in Dynamical Systems and Geometry*, Marseille, France
- 2015 Jun. *Statistical mechanics, integrability and combinatorics seminar*, Galileo Galilei Institute, Florence, Italy
- 2015 Apr. *Finger Lakes Probability Seminar*
- 2015 Apr. *Limit shapes Workshop*, ICERM
- 2015 Apr. *Colloquium*, University of Massachusetts, Boston
- 2015 Mar. *Simulation sessions at ICERM*
- 2014 Nov. *Algebra and Number Theory Seminar*, Pennsylvania State University
- 2014 Nov. *Probability Seminar*, University of Delaware
- 2014 Apr. *Colloquium*, University of Alabama Birmingham
- 2014 Feb. *Colloquium*, City College - City University of New York
- 2014 Feb. *Colloquium*, University of Rochester
- 2014 Feb. *Colloquium*, DePaul University
- 2014 Feb. *Colloquium*, University of Mississippi
- 2013 Oct. *Probability and Computational Finance Seminar*, Carnegie Mellon University
- 2013 Oct. *Algebra, Geometry and Combinatorics Seminar*, University of Pittsburgh
- 2013 Mar. *Geometry Seminar*, Texas A&M University
- 2013 Feb. *Random Tilings Workshop*, Simons Center, Stony Brook
- 2013 Jan. *Colloquium*, University of Pittsburgh
- 2012 Oct. *Probability and Computational Finance Seminar*, Carnegie Mellon University
- 2012 Oct. *Algebra, Geometry and Combinatorics Seminar*, University of Pittsburgh (2 lectures)

- 2012 Jun. *Geometry and Representation Theory Related to Geometric Complexity and Other Variants of P v. NP.*, AMS MRC program
- 2012 Sep. *Algorithms, Combinatorics and Optimization Seminar*, Carnegie Mellon University
- 2012 Apr. *FRAGMENT Seminar*, Colorado State University and University of Colorado, Boulder
- 2012 Mar. *Colloquium*, University of Mississippi
- 2012 Mar. *Probability Seminar*, University of Rochester
- 2012 Feb. *Postdoc seminar*, MSRI
- 2012 Feb. *sRTGC seminar*, University of California, Berkeley
- 2012 Feb. *Mathematical Physics and Probability Seminar*, University of California, Davis
- 2012 Jan. *AMS-MAA Joint Mathematics Meetings* (Boston), Special Session on Uniformly and Partially Hyperbolic Dynamical Systems
- 2011 Nov. *Geometry-Analysis Seminar*, Rice University
- 2011 Sep. *Workshop on Representation Theory, Geometry and Combinatorics*, University of California, Berkeley
- 2011 Aug. *The Sixth International Conference on Differential and Functional Differential Equations*, Steklov Mathematical Institute of the Russian Academy of Sciences
- 2011 Jul. *International Conference on Dynamical Systems, Nonlinear Analysis and their Applications*, Institute of Mathematics, National Academy of Sciences of Armenia
- 2011 Apr. *Workshop on Dynamical Systems and Related Topics*, University of Maryland
- 2011 Mar. *Group Actions on Measure Spaces*, Texas A&M University
- 2011 Mar. *Texas Ergodic Theory Workshop*, University of Houston
- 2011 Feb. *Geometry-Analysis Seminar*, Rice University
- 2010 Oct. *Groups and Dynamics Seminar*, Texas A&M University
- 2009 Oct. *Laboratoire de Probabilités*, Paris VI
- 2009 Sep. *Geometry-Analysis Seminar*, Rice University
- 2008 Sep. *Workshop on Random Tilings, Random Partitions and Stochastic Growth Processes*, Centre de recherches mathématiques (Montreal, Canada)

Supervising activities

Graduate students supervised

- 2020 PhD Nikolaos Chatzikonstantinou Ph.D., Geometric measure theory and harmonic analysis (co-advised with Alex Iosevich)
- 2020 PhD Erin Crossen Ph.D., Random features in combinatorial objects (co-advised with Jonathan Pakianathan)

Exam committees

- 2019 Sep. Jonathan Passant, Semin Yoo - Oral exams
- 2017 – Rupam Acharyya, PhD Committee External Member (Computer Science department)
- 2017 Feb. Fatma Cicek, Oral exam
- 2014 Oct. Vyacheslav Kiria-Kaiserberg, Oral exam

Undergraduate honors thesis

- 2019 Kevin Hunt, Random matrices

Undergraduate advising

- 2018 – 2020 Freshman and Sophomore advising (9 students)
- 2017 – 2020 Undergraduate major advising (4 students)

Other supervising activities

- 2016 – 2020 Supervised students (8 total) in writing 18-20 page mathematical expository papers (Math 391W).
- 2016 Summer Supervised Shuchen Wu, an undergraduate student at UR, in an independence study of Information Theory.
- 2010 Summer Designed and organized a new 8-week VIGRE Summer Research Experience for Undergraduates. Rice University. At the beginning of the REU taught the required background material and later provided daily supervision and guidance for the students' research activities.
Topic: "Exact Sampling of Skew Young Diagrams"
Students: Georgene Jalbuena, Joshua Cory
Results: The results are published online at <http://cnx.org/content/m34949/latest/>.

Professional service

Organizing activities for conferences and meetings

- 2021 Jul. Co-organizer of the CIMPA summer school on Finite point configurations and discrete integrable systems in Tsakhkadzor, Armenia
- 2018 Jan. Co-organizer (with A. Dzhamay and V. Dragovic) of a Special Session on "Algebraic, Analytic, and Geometric Aspects of Integrable Systems, Painlevé equations, and Random Matrices" at the 2018 AMS-MAA Joint Mathematics Meetings in San Diego, CA.

Professional committees

- 2020 NSF reviewer 2020
- 2017 – 2021 Board member of the Armenian Mathematical Union

Journals refereed

International Mathematics Research Notices (IMRN)
 Australasian Journal of Combinatorics
 Electronic Journal of Probability
 Electronic Journal of Combinatorics
 Moscow mathematical journal
 Letters in mathematical physics
 FPSAC
 Cambridge University Press
 Mathematical Physics, Analysis and Geometry
 Groups, Geometry, and Dynamics
 AMS MathSciNet

Miscellaneous service activities

- 2018 Jan. Poster session judge at the 2018 AMS-MAA Joint Mathematics Meetings in San Diego, CA.

University service

- 2018 – 2020 Faculty Council Representative

Departmental service

University of Rochester

- 2020 – 2021 Hiring Committee
- 2020 – 2021 Undergraduate research community
- 2018 – 2021 Web and computing
- 2019 – Spring Co-organizer of the Rochester Math Olympiad (problem suggestions and grading)
- 2018 – 2019 Meliora committee
- 2017 – 2019 Publicity committee
- 2014 – 2018 Probability seminar organizer
- 2015 – 2018 Grader for Rochester Math Olympiad
- 2015 – 2017 Hiring Committee

Rice University

- 2011 Fall Departmental Colloquium Committee (member)
- 2010 Fall Putnam Seminar organizer (joint with Michael Boshernitzan)
- 2009 – 2010 Current Math Seminar organizer (joint with Prudence Heck)

Teaching experience

University of Rochester

- 2021 Spring Graduate Probability - (Math 403)
- 2020 Fall Honors Calculus 1 - (Math 171)
- 2020 Fall Discrete Mathematics (Course czar) - (Math 150)
- 2020 Spring Graduate Probability - (Math 403)
- 2019 Fall Functions of a Real Variable - (Math 265)
- 2019 Fall Discrete Mathematics (Course czar) - (Math 150)
- 2019 Spring Introduction to Stochastic Processes - (Math 202)
- 2019 Spring Transition to Advanced Math - (Math 200W)
- 2018 Fall Calculus 2 (Course czar) - (Math 162)
- 2018 Spring Calculus 2 (Course czar) - (Math 162)
- 2017 Fall Graduate Probability - (Math 403)
- 2017 Fall Introduction to Financial Math (Honors) - (Math 210H)
- 2017 Spring Financial Mathematics - (Math 391/591 - independent study)
- 2017 Spring Topics in Advanced Probability - Random matrix theory (Math 506)
- 2016 Fall Information theory - (Math 391W - independent study)
- 2016 Fall Introduction to Financial Math (Honors) - (Math 210H)
- 2016 Fall Introduction to Probability (Course czar) - (Math 201)
- 2016 Spring Linear Algebra - (Math 235)
- 2015 Fall Introduction to Probability (Course czar) - (Math 201)
- 2015 Fall Topics in Advanced Probability - Statistical mechanics: the dimer model (Math 506)
- 2014 Fall Introduction to Probability - (Math 201)
- 2014 Fall Graduate Probability - (Math 503)

Carnegie Mellon University

- 2013 Fall Algebraic Structures - (Math 21-373)
- 2013 Fall Linear Algebra I - (Math 21-341)
- 2012 Fall Probability - (Math 21-325)
- 2012 Fall Linear Algebra I - (Math 21-341)

Rice University

- 2011 Fall Introduction to Random Matrix Theory - (Math 521) - Graduate topics course offered for the first time at Rice University
- 2011 Fall Ordinary Differential Equations and Linear Algebra - (Math 211)
- 2011 Spring Calculus 2 - (Math 102)
- 2010 Fall Lie Theory - (Math 371) - Offered for the first time at Rice University. Designed and taught the course.
- 2010 Fall Ordinary Differential Equations and Linear Algebra - (Math 211)
- 2010 Spring Calculus 2 - (Math 102)
- 2009 Fall Introduction to Partial Differential Equations - (Math 381)
- 2009 Fall Calculus 2 - (Math 102)

University of California, Berkeley

- 2008 Fall Analytical Geometry and Calculus - (Math 16A)
- 2008 Summer Linear Algebra and Differential Equations - (Math 54)
- 2006 Fall Linear Algebra and Differential Equations - (Math 54)
- 2006 Summer Linear Algebra and Differential Equations - (Math 54)
- 2005 Fall Calculus 2 - (Math 1B)
- 2005 Spring Linear Algebra and Differential Equations - (Math 54)
- 2004 Fall Calculus 2 - (Math 1B)

Outreach

- 2020 Aug. Co-organizer and instructor at an NSF Tripods REU, University of Rochester
- 2018, 2019 Organizer of the University of Rochester Integration Bee
- 2019 Feb. Society of Undergraduate Math Students, University of Rochester
- 2018 Sep. Undergraduate Colloquium, University of Northern Colorado
- 2018 Jan. The Mathematical Contest in Modeling (MCM) Team Advisor
- 2017 Jun. Lecture series at Yerevan State University
- 2016 Oct. Society of Undergraduate Math Students, University of Rochester
- 2014 Apr. Undergraduate Colloquium, Carnegie Mellon University
- 2013 Jul. Summer Undergraduate Applied Mathematics Institute REU, Carnegie Mellon University
- 2012 Nov. Math Club, Carnegie Mellon University
- 2012 Oct. Undergraduate Colloquium, Carnegie Mellon University
- 2012 Apr. Undergraduate Colloquium, University of Northern Colorado
- 2012 Jan. A lecture at the Marin Math Circle
- 2011 Jul. A mini-course (with Alexander Bufetov) at a summer school organized by the Russian Academy of Sciences
Topic: "Orthogonal Polynomials"