

Darij Grinberg

Assistant Professor (→ Associate Professor starting Fall 2025)
at Drexel University

<i>Affiliation (since 2019)</i>	<i>Contact</i>
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Field of research

algebraic combinatorics / Hopf algebras / Young tableaux / combinatorial representation theory / noncommutative algebra / invariant theory

Education and affiliations

2025– [Associate Professor](#) at [Drexel University](#) (starting September 2025).

2019–2025 [Assistant Professor](#) at [Drexel University](#).

2024 [Oberwolfach Research Fellowship](#) (joint project with Sarah Brauner, Patricia Commins, Franco Saliola) at [Mathematisches Forschungsinstitut Oberwolfach](#) (October 13 – November 1).

2021 [Oberwolfach Research Fellowship](#) (joint project with Tom Roby) at [Mathematisches Forschungsinstitut Oberwolfach](#) (July 18 – August 6).

2020 [Postdoctoral Fellow](#) at [Institut Mittag-Leffler](#) (January – March).

2019, 2020 [Leibniz Fellow](#) at [Mathematisches Forschungsinstitut Oberwolfach](#).

2016–2019 Dunham Jackson Assistant Professor at [University of Minnesota](#), working with Victor Reiner.

2016, June 3 Ph.D. in Mathematics at [Massachusetts Institute of Technology](#), advised by Alexander Postnikov. ([Thesis](#)¹.)

2011–2016 Graduate student at [Massachusetts Institute of Technology](#).

¹Thesis committee: Alexander Postnikov, Pavel Etingof, Ira Gessel.

All material in this thesis also appears in the preprints and papers listed below.

- 2011, July 1** Diploma (rough equivalent to M.S.) in Mathematics at the [Ludwig-Maximilians-Universität München](#) (Munich), with a minor in Computer Science. (Thesis; comprehensive grade “very good”.)
- 2006–2011** Undergraduate at the [Ludwig-Maximilians-Universität München](#) (Munich).

Publications and preprints (peer-reviewed marked with #)

- 2025** *Top to random and reverse: analysis of a new descent algebra shuffle*, joint with Jonathan Parlett, arXiv:2508.06740.
- 2025** *The representation theory of somewhere-to-below shuffles*, arXiv:2508.00752.
- 2025** *An equality for balanced digraphs*, joint with Benjamin Liber, arXiv:2507.22388.
- 2025** *Rook sums in the symmetric group algebra*, arXiv:2507.22386.
- 2025** *The q -deformed random-to-random family in the Hecke algebra*, joint with Sarah Brauner, Patricia Commins, Franco Saliola, arXiv:2503.17580, preprint.
- 2024** *The Dowker theorem via discrete Morse theory*, joint with Morten Brun, arXiv:2407.15454, preprint.
- 2024** *Monomial identities in the Weyl algebra*, joint with Tom Roby, Stephan Wagner, Mei Yin, arXiv:2405.20492, submitted.
- 2024** *Necklaces over a group with identity product*, joint with Peter Mao, arXiv:2405.08937, submitted.
- 2024** *The diagonal derivative of a skew Schur polynomial*, joint with Nazar Korniiichuk, Kostiantyn Molokanov, and Severyn Khomych, arXiv:2402.14217, submitted.
- 2023** *The Pak–Postnikov and Naruse skew hook length formulas: a new proof*, joint with Nazar Korniiichuk, Kostiantyn Molokanov, and Severyn Khomych, arXiv:2310.18275, submitted.
- 2023** *Commutator nilpotency for somewhere-to-below shuffles*, arXiv:2309.05340, preprint.
- # **2023** *The enriched q -monomial basis of the quasisymmetric functions*, joint with Ekaterina A. Vassilieva, arXiv:2309.01118, *Electronic Journal of Combinatorics* **31(4)** (2024), #P4.20.
- 2023** *The Redei–Berge symmetric function of a directed graph*, joint with Richard P. Stanley, arXiv:2307.05569, preprint.

- # **2023** *The Bhargava greedoid as a Gaussian elimination greedoid*, arXiv:2001.05535, Electronic Journal of Combinatorics **31(2)** (2024), #P2.28.
- # **2023** *Multislant matrices and Jacobi–Trudi determinants over finite fields*, joint with Omesh Dhar Dwivedi and Jonah Blasiak, arXiv:2302.07239, Finite Fields and Their Applications **91** (2023), 102262.
- # **2022** *The one-sided cycle shuffles in the symmetric group algebra*, joint with Nadia Lafrenière, arXiv:2212.06274, Algebraic Combinatorics **7** (2024) no. 2, pp. 275–326.
- # **2022** *The entry sum of the inverse Cauchy matrix* (expository), arXiv:2301.09777, Mathematical Intelligencer **46** (2024), pp. 46–48.
- # **2022** *Birational rowmotion on a rectangle over a noncommutative ring*, joint with Tom Roby, arXiv:2208.11156, Combinatorial Theory **3** (2023), issue 3, #7.
- # **2022** *On the principal minors of the powers of a matrix*, Gazeta Matematica, Seria A, Anul **XL** (CXIX), nr. 1–2, 2022, arXiv:2204.07885v1.
- 2021** *The pre-Pieri rules*, arXiv:2110.03108.
- # **2021** *On the rank of Hankel matrices over finite fields*, joint with Omesh Dhar Dwivedi, arXiv:2109.05415, Linear Algebra and its Applications **641** (2022), pp. 156–181.
- # **2021** *On the square of the antipode in a connected filtered Hopf algebra*, arXiv:2109.02101, Communications in Mathematics **31** (2023), issue 1.
- 2021** *The path-missing and path-free complexes of a directed graph*, joint with Lukas Katthän, Joel Brewster Lewis, arXiv:2102.07894, submitted.
- # **2021** *The Pelletier–Ressayre hidden symmetry for Littlewood–Richardson coefficients*, Combinatorial Theory **1** (2021), #16, arXiv:2008.06128.
- # **2021** *The Elser nuclei sum revisited*, Discrete Mathematics & Theoretical Computer Science **23** (2021) no. 1, arXiv:2009.11527.
- 2020** *Three variations on the linear independence of grouplikes in a coalgebra*, joint with Gérard Duchamp, Vincel Hoang Ngoc Minh, arXiv:2009.10970.
- # **2020** *Petrie symmetric functions*, arXiv:2004.11194, Algebraic Combinatorics **5**, issue 5 (2022), pp. 947–1013.
- # **2020** *An efficiently computable characterization of stability and instability for linear cellular automata*, joint with Alberto Dennunzio, Enrico Formenti, Luciano Margara, Journal of Computer and System Sciences **122** (2021),

- pp. 63–71. (See [arXiv:1907.08565](#) for a preliminary version of this paper that includes my contribution.)
- # 2020 *Chaos and ergodicity are decidable for linear cellular automata over $(\mathbb{Z}/m\mathbb{Z})^n$* , joint with Alberto Dennunzio, Enrico Formenti, Luciano Margara, [Information Sciences](#) **539** (2020), pp. 136–144. (A fragment of this paper that includes my contribution.)
 - # 2020 *Dynamical Behavior of Additive Cellular Automata over Finite Abelian Groups*, joint with Alberto Dennunzio, Enrico Formenti, Luciano Margara, [Theoretical Computer Science](#) **843** (2020), pp. 45–56.
 - # 2020 *Proof of three conjectures on determinants related to quadratic residues*, joint with Zhi-Wei Sun, Lili Zhao, [arXiv:2007.06453](#), [Linear and Multilinear Algebra](#) **70** (2022), no. 19, pp. 3734–3746.
 - # 2019 *A greedoid and a matroid inspired by Bhargava’s p -orderings*, joint with Fedor Petrov, [arXiv:1909.01965](#), [Electronic Journal of Combinatorics](#) **28** (3) (2021), #P3.6.
 - 2019 *Commutators, matrices and an identity of Copeland*, [arXiv:1908.09179](#).
 - # 2019 *A double Sylvester determinant*, [arXiv:1901.11109](#), [Ars Mathematica Contemporanea](#) [S.l.], v. **20**, n. 2, pp. 261–274.
 - # 2019 *Multiline queues with spectral parameters*, joint with Erik Aas and Travis Scrimshaw, [arXiv:1810.08157](#), [Communications in Mathematical Physics](#) **374** (3), pp. 1743–1786.
 - # 2019 *The n body matrix and its determinant*, joint with Peter J. Olver, [arXiv:1802.02900](#), [SIAM Journal on Applied Algebra and Geometry](#) **3**(1) (2019), pp. 67–86.
 - # 2018 *Shuffle-compatible permutation statistics II: the exterior peak set*, [arXiv:1806.04114](#), [Electronic Journal of Combinatorics](#) **25** (2018), Paper #P4.17.
 - 2017 *Noncommutative Abel-like identities*.
 - # 2017 *On binomial coefficients modulo squares of primes*, [arXiv:1712.02095](#), [Integers](#) **19** (2019), A14.
 - # 2017 *Critical groups for Hopf algebra modules*, joint with Jia Huang, Victor Reiner, [arXiv:1704.03778](#), [Mathematical Proceedings of the Cambridge Philosophical Society](#) **168** (2020), no 3., pp. 473–503.
 - # 2017 *t -unique reductions for Mészáros’s subdivision algebra*, [arXiv:1704.00839](#), [SIGMA](#) **14** (2018), 078, 34 pages.

- 2016** *From Chio Pivotal Condensation to the Matrix-Tree theorem*, joint with Karthik Karnik, Anya Zhang, arXiv:1606.08193 (report of student research).
- 2016** *Generalized Whitney formulas for broken circuits in ambigraphs and matroids*, arXiv:1604.03063.
- 2016** *The Bernstein homomorphism via Aguiar-Bergeron-Sottile universality*, arXiv:1604.02969.
- # **2016** *Proof of a conjecture of Bergeron, Ceballos and Labbé*, joint with Alexander Postnikov, arXiv:1603.03138, *New York Journal of Mathematics* **23** (2017), pp. 1581–1610.
- # **2015** *Double posets and the antipode of QSym*, arXiv:1509.08355, *Electronic Journal of Combinatorics* **24** (2017), Paper #P2.22.
- # **2015** *Refined dual stable Grothendieck polynomials and generalized Bender-Knuth involutions*, joint with Pavel Galashin and Gaku Liu, arXiv:1509.03803, *Electronic Journal of Combinatorics* **23** (2016), Paper #P3.14.
- 2015** *The signed random-to-top operator on tensor space (draft)*, arXiv:1505.01201.
- # **2014** *Dual immaculate creation operators and a dendriform algebra structure on the quasisymmetric functions*, arXiv:1410.0079, *Canadian Journal of Mathematics* **69** (2017), pp. 21–53.
- 2014** *Hopf Algebras in Combinatorics*, joint with Victor Reiner, arXiv:1409.8356 (extended lecture notes).
- # **2014** *Iterative properties of birational rowmotion*, joint with Tom Roby, arXiv:1402.6178. This has been published as two papers due to its length:
- *Iterative Properties of Birational Rowmotion I: Generalities and Skeletal Posets*, *Electronic Journal of Combinatorics* **23** (2016), Paper #P1.33;
 - *Iterative Properties of Birational Rowmotion II: Rectangles and Triangles*, *Electronic Journal of Combinatorics* **22** (2015), Paper #P3.40.
- # **2013** *Boolean Witt vectors and an integral Edrei-Thoma theorem*, joint with James Borger, arXiv:1311.5031, *Selecta Mathematica* **22** (2), pp. 595–629.
- 2011** *Poincaré-Birkhoff-Witt type results for inclusions of Lie algebras*, diploma thesis (link to updated version) under supervision of Andreas Rosenschon and guidance by Damien Calaque and Giovanni Felder. The thesis has not been submitted to a journal but has already been cited twice.

2011 [Zeckendorf family identities generalized](#), arXiv:1103.4507.

2007– Various [problems and solutions](#) submitted to mathematical journals.

2002–2004 Four publications in *Forum Geometricorum* on elementary geometry:
[The Apollonius Circle as a Tucker Circle](#) (2002), joint with Paul Yiu;
[On the Kosnita point and the reflection triangle](#) (2003);
[Orthopoles and the Pappus Theorem](#) (2004), joint with Atul Dixit;
[A Generalization of the Kiepert Hyperbola](#) (2004), joint with Alexei Myakishev;
 and problem 11025 proposed in the American Mathematical Monthly (joint with Floor van Lamoen).

Conference proceedings (peer-reviewed marked with #)

- # **2025** Darij Grinberg, Ekaterina A. Vassilieva, [A permutation based approach to the \$q\$ -deformation of the Dynkin Operator](#) (extended abstract), arXiv:2504.09709, accepted at the proceedings of FPSAC 2025.
- # **2024** Darij Grinberg, [A Solomon Mackey formula for graded bialgebras](#), arXiv:2401.14648, accepted at the proceedings of CATMI 2023 Bergen.
- # **2024** Darij Grinberg, Ekaterina A. Vassilieva, [Quasisymmetric expansion of Hall-Littlewood symmetric functions](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 91B.86 (2024), 12 pp. (FPSAC 2024).
- # **2024** Darij Grinberg, Nadia Lafrenière, [The somewhere-to-below shuffles in the symmetric group and Hecke algebras](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 91B.16 (2024), 12 pp. (FPSAC 2024).
- # **2023** Darij Grinberg, Tom Roby, [Birational rowmotion over noncommutative rings](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 89B.50 (2023), 12 pp. (FPSAC 2023).
- # **2023** Darij Grinberg, Ekaterina A. Vassilieva, [The algebra of extended peaks](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 89B.46 (2023), 12 pp. (FPSAC 2023).
- # **2022** Darij Grinberg, Ekaterina A. Vassilieva, [A \$q\$ -deformation of enriched \$P\$ -partitions](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 86B.78 (2022), 12 pp. (FPSAC 2022).
- # **2021** Darij Grinberg, Ekaterina A. Vassilieva, [Weighted posets and the enriched monomial basis of \$QSym\$](#) (extended abstract), Séminaire Lotharingien de Combinatoire, 85B.58 (2021), 12 pp. (FPSAC 2021).

- # **2020** Darij Grinberg, *The Petrie symmetric functions (extended abstract)*, Séminaire Lotharingien de Combinatoire 84B.61 (2020), 12 pp. (FPSAC 2020).
- # **2020** Darij Grinberg, Fedor Petrov, *The Bhargava greedoid (extended abstract)*, Séminaire Lotharingien de Combinatoire 84B.47 (2020), 12 pp. (FPSAC 2020).
- # **2020** Alberto Dennunzio, Enrico Formenti, Darij Grinberg, Luciano Margara, *From Linear to Additive Cellular Automata*, Leibniz International Proceedings in Informatics (LIPIcs), Volume 168 (ICALP 2020).
- # **2019** Darij Grinberg, *A quotient of the ring of symmetric functions generalizing quantum cohomology (extended abstract)*, Séminaire Lotharingien de Combinatoire 82B.86 (2019), 12 pp. (FPSAC 2019).
- # **2018** Erik Aas, Darij Grinberg, Travis Scrimshaw, *Multiline queues with spectral parameters (extended abstract)*, Séminaire Lotharingien de Combinatoire, 80B.46 (2018), 12 pp. (FPSAC 2018).
- # **2017** Darij Grinberg, *Double Posets and the Antipode of QSym (extended abstract)*, Séminaire Lotharingien de Combinatoire, 78B.33 (2017), 12 pp. (FPSAC 2017).
- # **2014** Darij Grinberg, Tom Roby, *The order of birational rowmotion (extended abstract)*, DMTCS Proceedings vol. AT, 26th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2014), pp. 753–764.

Teaching

- 2025** lecturer at Drexel University in [Math 530 \(Graph Theory\)](#).
- 2025** lecturer at Drexel University in [Math 221 \(Discrete Mathematics\)](#).
- 2025** lecturer at Drexel University in [Math 332 \(Abstract Algebra II: Rings and Fields\)](#).
- 2025** lecturer at Drexel University in [Math 221 \(Discrete Mathematics\)](#).
- 2024** lecturer at Drexel University in [Math 235 \(Mathematical Problem Solving\)](#).
- 2024** lecturer at Drexel University in [Math 701 \(Topics: Symmetric Group Algebra\)](#).
- 2024** lecturer at Drexel University in [Math 221 \(Discrete Mathematics\)](#).
- 2024** lecturer at Drexel University in [Math 531 \(Algebraic Combinatorics\)](#).

- 2023** lecturer at Drexel University in [Math 235 \(Mathematical Problem Solving\)](#).
- 2023** lecturer at Drexel University in [Math 530 \(Graph Theory\)](#).
- 2023** lecturer at Drexel University in [Math 332 \(Abstract Algebra II: Rings and Fields\)](#).
- 2023** lecturer at Drexel University in [Math 221 \(Discrete Mathematics\)](#).
- 2022–2023** mentor in [Yulia's Dream](#) (a section of [the MIT's PRIMES program](#)), supervising a team of three Ukrainian students writing a paper on algebraic combinatorics.
- 2022** lecturer at Drexel University in [Math 222 \(Enumerative Combinatorics\)](#).
- 2022** lecturer at Drexel University in [Math 530 \(Graph Theory\)](#).
- 2021** lecturer at Drexel University in [Math 235 \(Mathematical Problem Solving\)](#).
- 2021** lecturer at Drexel University in [Math 220 \(Introduction to Mathematical Reasoning\)](#).
- 2021** lecturer at Drexel University in [Math 504 \(Advanced Linear Algebra and Matrix Analysis\)](#).
- 2021** lecturer at Drexel University in [Math 701 \(Algebraic Combinatorics\)](#).
- 2021** lecturer at Drexel University in [Math 533 \(Abstract Algebra I: Rings and Modules\)](#).
- 2020** lecturer at Drexel University in [Math 235 \(Mathematical Problem Solving\)](#).
- 2019** lecturer at Drexel University in [Math 201 \(Linear Algebra\)](#).
- 2019** lecturer at Drexel University in [Math 222 \(Enumerative Combinatorics\)](#).
- 2019** lecturer at UMN in [Math 4281 \(Introduction to Modern Algebra\)](#).
- 2018** lecturer at UMN in [Math 5705 \(Enumerative Combinatorics\)](#).
- 2018** lecturer at UMN in [Math 4707 \(Combinatorics\)](#).
- 2017** lecturer at UMN in [Math 4990](#) and [Math 4707](#) (two combinatorics classes).
- 2017** lecturer at UMN in [Math 5707 \(Graph Theory\)](#).
- 2016** lecturer at UMN in [Math 4242 \(Applied Linear Algebra\)](#).

- 2012–2015** mentor in [the MIT’s PRIMES program](#), supervising [two projects](#) (2012, 2013) by William Kuszmaul and [one](#) (2014) by Eric Neyman, as well as a reading course by two new students (2015). In 2015, I was sponsored by a [George Lusztig PRIMES mentorship](#).
- 2015** teaching assistant at MIT in 18.781 (Theory of Numbers) by Ju-Lee Kim.
- 2014** teaching assistant and recitation leader at MIT in 18.06 (Linear Algebra) by Alexander Postnikov.
- 2013** teaching assistant at MIT in 18.310A (Principles of Discrete Applied Mathematics) by Neil Olver, and in 18.S996 (Category Theory for Scientists) by David Spivak.
- 2009** teaching assistant and recitation leader at LMU Munich in a Euclidean geometry class by Rudolf Fritsch.
- 2007** teaching assistant and recitation leader at LMU Munich in an Abstract Algebra I class by Hans-Jürgen Schneider.

Selected talks

- 2025** at [SageDays 129 Hokkaido \(remote\)](#) on open problems in symmetric group algebras.
- 2025** at [KTH Stockholm 2025](#), [Rutgers 2025](#) and [CAGE \(Philadelphia\) 2025](#) and at [AlCoVE 2025 \(shorter version\)](#) on random-to-random shuffles in the Hecke algebra.
- 2024** at [Combinatorics and Arithmetic for Physics \(IHES\) 2024](#) on monomial identities in Weyl algebras.
- 2024** short talks at [Harvard University](#) and at the [Sophus Lie Conference Center \(Nordfjordeid\)](#) on open problems in symmetric group algebras.
- 2024** at [Howard University \(AMS sectional meeting\) 2024](#) on rook sums in the symmetric group algebra.
- 2023** at [George Washington University 2023](#) and [Temple University 2023](#) and [Uppsala Universitet 2024](#) on one-sided cycle shuffles in the symmetric group algebra. (The link goes to the last and most comprehensive version of the talk.)
- 2023** at [IPAC \(Important Papers in Algebraic Combinatorics, a zoom seminar\) 2023](#) and at [SLC 90 \(Bad Boll\) 2023](#) and in [Haverford College 2023](#) and at [Combinatorics and Arithmetic for Physics \(IHES\) 2023](#) and in [KTH Stockholm 2024](#) and [University of Denver 2024](#) on Redei-Berge symmetric functions.

- 2023** at CATMI (Category Theory at Work in Computational Mathematics and Theoretical Informatics) 2023 on natural endomorphisms of connected graded bialgebras.
- 2023** at Algebraic and Combinatorial Perspectives in the Mathematical Sciences 2023 on chromatic symmetric functions and their generalizations.
- 2023** at KTH (Stockholm) on noncommutative birational rowmotion.
- 2022** at MIT (Combinatorics seminar) on noncommutative birational rowmotion.
- 2022** at Waterloo Algebraic Combinatorics Seminar and at Oberseminar Kombinatorik Bochum and at Combinatorics and Arithmetic for Physics (IHES) 2022 on one-sided cycle shuffles in the symmetric group algebra.
- 2022** at New York Number Theory Zoom Seminar on greedoids from ultrametric spaces and phylogenetic trees (with solutions to exercises).
- 2021** at BIRS, Kelowna and at Combinatorics and Arithmetic for Physics (IHES) 2021 on noncommutative birational rowmotion.
- 2020** at Algebraic and Combinatorial Perspectives in the Mathematical Sciences 2020 on the Pelletier–Ressayre symmetry of Littlewood–Richardson coefficients.
- 2020** at Institut Mittag-Leffler and at Rutgers Experimental Mathematics Seminar (more introductory version of the talk) on greedoids from ultrametric spaces and phylogenetic trees.
- 2020** at Institut Mittag-Leffler on the Petrie symmetric functions.
- 2019** at Drexel University and at University of Minnesota (Combinatorics seminar) on generalized quantum cohomology.
- 2018** at University of Connecticut (Algebra seminar) and at Massachusetts Institute of Technology (Combinatorics seminar) on generalized quantum cohomology.
- 2018** at Dartmouth College Hanover on shuffle-compatible permutation statistics.
- 2018** at Leibniz Universität Hannover on multiline queues.
- 2018** at University of Minnesota Student Combinatorics Seminar, Minneapolis on the diamond lemma (expository talk).
- 2018** at University of Washington, Seattle and at University of Illinois Urbana-Champaign (slightly streamlined version of above talk) on shuffle-compatible permutation statistics; also, expository pre-talk for the latter talk.

- 2017** at [University of Wisconsin, Madison](#) on critical groups of Hopf algebra modules.
- 2017** at [Combinatorial Algebra meets Algebraic Combinatorics, UQAM, Montréal](#), and at [Cornell](#) (slightly extended version of Montréal talk) on function-field analogues of Witt vectors.
- 2016** at [AMS Sectional Meeting, University of St. Thomas, Minneapolis](#) on signs of reduced expressions.
- 2016** at the [Combinatorics Seminar at Brandeis and at Massachusetts Institute of Technology](#) (thesis defense) on quasisymmetric functions.
- 2015** at [University of Minnesota Combinatorics Seminar, Minneapolis](#) and at [AMS Sectional Meeting, Chicago](#) on refined dual stable Grothendieck polynomials.
- 2014** at [The Applied Algebra Seminar, York University, Toronto](#) on birational rowmotion.
- 2014** at [Arbeitsgemeinschaft Diskrete Mathematik, Vienna](#) on birational rowmotion.
- 2013** at [University of Connecticut](#) on integer-valued polynomials (expository talk).

Various contributions

- 2021–** Co-organizing [the CAGE \(Combinatorics, Algebra, and Geometry\) Seminar](#) at Drexel University and University of Pennsylvania in the academic years 2021–2025.
- 2022–2023** Organizing [the Drexel Mathematics Colloquium](#).
- 2022** Organizing – jointly with Tom Roby – a virtual miniconference: [Birational Combinatorics, June 8, 2022](#).
- 2018** Organizing committee of [SageDays@ICERM, July 2018](#).
- 2012–** [Programming and code review](#) for the [SageMath](#) project.
- 2010–** Member of [MathOverflow](#) and [math.stackexchange](#), contributing over 500 answers.
- 2006–** Grading/coordination in mathematical contests, including the [International Mathematical Olympiad](#) (2009 and 2011) and [Putnam Competition](#) (2020 and 2021). Administering the Putnam Competition at Drexel University (2020, 2021, 2023). Proposal of problems for the Putnam Competition (2023 B5 and B6).

- 2005**– Mathematical exposition at various levels (mostly undergraduate) on [web-site](#).

Research mentored/advised

- 2025** Yuxuan Sun: Google Summer of Code project on SageMath development.
- 2024**– Mikey Becht (graduate student at Drexel University): ongoing thesis work.
- 2024**– Peter Mao (graduate student at Drexel University): one joint submitted paper (see “publications and preprints” above), and ongoing thesis work.
- 2024**– Jonathan Parlett (undergraduate research student at Drexel University): one submitted paper (*Fixed Point Homing Shuffles*, [arXiv:2410.22548](#)) and one ongoing project in the writing-up stage (*Top to random and reverse: analysis of a new descent algebra shuffle*, [arXiv:2508.06740](#)).
- 2022–2023** Nazar Korniiichuk, Kostiantyn Molokanov, and Severyn Khomych (Yulia’s Dream project for Ukrainian students): two joint submitted papers (see “publications and preprints” above).
- 2014** [Eric Neyman](#), *Cylindric Young Tableaux and their Properties*, [arXiv:1410.5039](#), mentored through the [MIT PRIMES](#) project.
- 2013** [William Kuszmaul](#), *A New Approach to Enumerating Statistics Modulo n* , [arXiv:1402.3839](#), mentored through the [MIT PRIMES](#) project.
- 2012** [William Kuszmaul](#), *Counting Permutations Modulo Pattern-Replacement Equivalences for Three-Letter Patterns*, *Electron. J. Comb.*, Volume 20, Issue 4 (2013), #P10, mentored through the [MIT PRIMES](#) project.

Awards and honors

- 2022** 2021-22 Devereux Award for Junior Faculty at Drexel University.
- 2015** [George Lusztig PRIMES](#) mentorship for “exceptional mentor service in past years”.
- 2008** first place in the 15th [Vojtěch Jarník Annual International Mathematical Competition](#) (a contest for university students).
- 2006–2011** scholarship from the [Studienstiftung des Deutschen Volkes](#).
- 2006** gold medal in the [International Mathematical Olympiad](#).
- 2004–2005** silver medals in the International Mathematical Olympiad.
- 2003–2006** Bundessieger (national-level award) in the [Bundeswettbewerb Mathematik Deutschland](#) (German national mathematical olympiad).