

Daniel Soskin

dsoskin@math.ucla.edu
+19293010307

Employment

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| Assistant Adjunct Professor
– Academic mentor: Igor Pak | July 2025–July 2026 UCLA, CA, USA |
| Member: Institute for Advanced Study
– Academic mentor: June Huh | Sept 2024–July 2025 IAS Princeton, NJ, USA |
| C.-C. Hsiung Visiting Assistant Professor
– Academic mentor: Mark Skandera | Aug 2023–Aug 2024, Lehigh University, PA, USA |

Education

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| PhD in Mathematics
– <i>The University of Notre Dame du Lac</i>
– Academic advisor: Michael Gekhtman | 2017–2023, Notre Dame, IN, USA |
| M.S. in Mathematics
– <i>The University of Notre Dame du Lac</i> | 2017–2019, Notre Dame, IN, USA |
| B.S. in Mathematics
– <i>Taras Shevchenko National University of Kyiv</i>
– Academic advisor: Anatoly N. Kochubei | 2012–2016, Kyiv, Ukraine |
| High School
– <i>Rusanovsky Mathematical Lyceum</i> | 2007–2012, Kyiv, Ukraine |

Research Interest

Algebra, Combinatorics, Cluster algebras, Complexity theory, Schur positivity and total positivity, immanants, determinantal inequalities

Publications and Preprints

- “Bounded ratios for Lorentzian matrices”, with Daoji Huang, June Huh and Botong Wang, [Arxiv](#)
- “Equalities and inequalities for balanced products of Schur functions”, joint with Igor Pak, in progress
- “Hadamard product of dual Jacobi–Trudi matrices”, with Robert Angarone, Jang Soo Kim and Jaeseong Oh, in progress
- “Bounded Ratios and Convergence of String Integrals”, with Nick Early, Michael Gekhtman, in progress
- “Multiplicative inequalities in cluster algebras of finite type”, joint with Zachary Greenberg and Michael Gekhtman, [Arxiv](#), accepted to [Algebraic Combinatorics](#)
- “Generalized diagonals in positive semi-definite matrices”, joint with Robert Angarone, in [European Journal of Combinatorics](#), Vol. 130, (2025)
- “Permanental inequalities for totally positive matrices”, joint with Mark Skandera, in [The Electronic Journal of Combinatorics](#), Volume 32, Issue 1, (2025), poster at FPSAC’25
- “Plücker inequalities for weakly-separated coordinates in totally nonnegative Grassmannians”, joint with Prateek K. Vishwakarma, [Arxiv](#) (2023), submitted, poster at FPSAC’25

- “*Barrett-Johnson inequalities for totally nonnegative matrices*”, joint with Mark Skandera, in [Linear and Multilinear Algebra](#), Volume 73, Issue 10, pp. 2320-2343, shorter version in Séminaire Lotharingien de Combinatoire 89B, Article 29.
- “*On bounded ratios of minors of totally positive matrices*”, joint with Michael Gekhtman, in [Linear Algebra and its Applications](#), Volume 715, 15 June 2025, pp. 46-67
- “*Asymptotic Properties of the p -Adic Fractional Integration Operator*”, joint with Anatoly N. Kochubei, in [Methods of Functional Analysis and Topology](#), 23 (2017), no. 2, pp. 155-163

Talks at Conferences and Seminars

- “*Bounded ratios for Lorentzian matrices*”, AMS Meeting, USA, 2025
- “*Bounded ratios for Lorentzian matrices*”, UCLA, USA, 2025
- “*Multiplicative inequalities for cluster algebras of finite type*”, Workshop on Matrices and Operators, University of Regina, (on Zoom), 2025
- “*Multiplicative inequalities for cluster algebras of finite type*”, Mathematical Congress of the Americas 2025
- “*Multiplicative inequalities for cluster algebras of finite type*”, Institute for Advanced Study, USA, 2025
- “*Multiplicative inequalities for cluster algebras of finite type*”, Canadian Mathematical Society (CMS) Summer Meeting, (on Zoom), 2025
- “*Equalities and Inequalities on Products of Schur functions*”, Institute for Advanced Study, USA, 2025
- “*Multiplicative inequalities for totally positive matrices*”, MIT, USA, 2025
- “*Total positivity and determinantal inequalities*”, UCLA, USA, 2024
- “*Total positivity and determinantal inequalities*”, Institute for Advanced Study, USA, 2024
- “*Cluster multiplicative inequalities on positive locus*”, Lehigh University, USA, 2024
- “*Multiplicative and additive determinantal inequalities for totally nonnegative matrices*”, Yale University, USA, 2023
- “*Multiplicative and additive determinantal inequalities for totally nonnegative matrices*”, University of Michigan, USA, 2023
- “*Multiplicative and additive determinantal inequalities for totally nonnegative matrices*”, UC San Diego, USA, 2023
- “*Barrett-Johnson inequalities for totally nonnegative matrices*”, AMS Special Session on Cluster Algebras, Positivity and Related Topics, Cincinnati, USA, 2023
- “*Determinantal inequalities for totally positive matrices*”, Regina University, Canada, 2023 (on Zoom)
- “*Determinantal inequalities for totally positive matrices*”, University of Leeds, UK, 2022
- “*Determinantal inequalities for totally positive matrices*”, Rutgers University, USA, 2022
- “*Determinantal inequalities for totally positive matrices*”, PCU of Rio de Janeiro, Brazil, 2022 (On Zoom)
- “*Determinantal inequalities for totally positive matrices*”, Michigan State University, USA, 2022
- “*Determinantal inequalities for totally positive matrices*”, University of Minnesota, USA, 2022
- “*Determinantal inequalities for totally positive matrices*”, University of Pennsylvania, USA, 2022
- “*Determinantal inequalities for totally positive matrices*”, Lehigh University, USA, 2022
- “*Determinantal inequalities for totally positive matrices*”, University of Notre Dame, USA, 2022

- “*Lie algebras and Dynkin diagrams*”, Young Researcher’s Workshop on Positivity in Lie Groups, Heidelberg University, Germany, 2022
- “*Skein and cluster algebras of marked surfaces*”, University of Notre Dame, USA, 2021
- “*Dimers and cluster integrable systems*”, University of Notre Dame, USA, 2019
- “*Arrangements of equal minors in the positive Grassmannian*”, University of Notre Dame, USA, 2019

Selected Conferences and Seminars attended

- “*Combinatorics of Enumerative Geometry workshop*”, Institute for Advanced Study, USA, February 2025
- “*Combinatorics of Fundamental Physics workshop*”, Institute for Advanced Study, USA, November 2024
- “*Geometry of Matroids workshop*”, Institute for Advanced Study, USA, October 2024
- “*The Many combinatorial legacies of Richard Stanley*”, Harvard, USA, June 2024
- “*Workshop on Theory and applications of total positivity*”, Caltech, USA, July 2023
- “*Cluster algebra and Poisson geometry conference*”, Levico Terme, Italy, June 2023
- “*Open Problems in Algebraic Combinatorics*”, University of Minnesota, USA, May 2022
- “*Graduate Meeting on Combinatorial Commutative Algebra*”, University of Minnesota, USA, May 2022
- “*Young Researcher’s Workshop on Positivity in Lie Groups*”, Heidelberg University, Germany, January 2022
- “*Interdisciplinary applications of cluster algebras*”, Isaac Newton Institute, UK, November 2021 (online)
- “*New developments in representation theory arising from cluster algebras*”, Isaac Newton Institute, UK, September 2021 (online)
- “*Algebra and Mathematical Physics Seminar*”, Notre Dame University, USA, Autumn 2020 (online)
- “*Cluster and Lie Theory Seminar*”, Notre Dame University, USA, Spring 2020

Technical Skills

- Python, Matlab, experience with high performance computing

Teaching experience

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| – Primary Instructor, Algorithms | Fall 2025 |
| – Primary Instructor, Introduction to Discrete Structures | Fall 2025 |
| – Primary Instructor, Survey of Calculus II | Summer 2024 |
| – Instructor, Calculus I | Fall 2023 |
| – Instructor, Research Experience for Undergraduates | Summer 2022 |
| – Instructor, Calculus II | Spring 2020, Spring 2024 |
| – Teaching Assistant, Calculus I | Fall 2018, Fall 2019, Fall 2020 |
| – Teaching Assistant, Calculus II | Spring 2019, Fall 2021, Spring 2022 |
| – Teaching Assistant, Calculus III | Spring 2021 |
| – Teaching Assistant, Linear Algebra and Differential Equations | Spring 2023 |

Achievements and Awards

- All-Ukrainian National Mathematical Olympiad Second Prize, 2011
- International Sharygin contest on Geometry (Dubna, Russia) Third Prize, 2010
- Kyiv mathematical contest First Prize, 2011
- Kyiv mathematical contest Second Prize, 2008 - 2010, 2012
- Mathematical student contest William Putman (mirror in Ukraine) Third Prize, 2012
- All-Ukrainian National Mathematical Olympiad for Students Third Prize, 2016
- Fellowship \$1500 for CMSA “Amplituhedra, Cluster Algebras, and Positive Geometry Conference” 2024
- Travel Grant \$400 for the conference “The Many Combinatorial Legacies of Richard P. Stanley” 2024

Service

- I volunteer to run one of the UCLA Olga Radko Endowed Math Circles, which is a free top-tier math circle attracting elementary, middle and high school students interested in mathematics and eager to learn.
- Organizer of AMS Special Session (2025 Fall Eastern Sectional Meeting)
- Leader of team of judges, judging and mentoring students as Discipline Captain at NDiSTEM (SACNAS in Phoenix, Arizona), 2024
- Teaching Assistant for Introduction to Cluster Algebras in International Centre for Mathematics in Ukraine, June 2024
- Organization of annual open mathematical contests for high-school students in Rusanovsky Mathematical Lyceum, Kyiv, 2012 - 2016
- Coaching a talented 10th grade student for the participation in the international Sharygin contest on geometry, Dubna, Russia, 2016
- Running the mathematical circle for advanced high-school students in Rusanovsky Mathematical Lyceum, Kyiv, 2012 - 2013

Peer reviews

- Referring for “Journal of Algebra”
- Referring for “Linear algebra and its applications”
- Referring for “Combinatorica”
- Referring for “International Mathematics Research Notices”
- Referring for “Combinatorial Theory”
- Referring for “European Journal of Combinatorics”
- Referring for “Algebraic Combinatorics”