Scott Neville
Curriculum Vitae

Department of Mathematics
1291 University of Oregon
175 Prince Lucien Campbell Hall
Eugene, OR 97403-1205

drscottn.phd
nevilles@umich.edu

Academic Interests

Main interests: Quiver mutations, algebraic and algorithmic combinatorics.

Current projects: Mutation equivalence and mutation invariants of quivers.

Previous projects: Theoretical and applied machine learning, polymer growth, algorithms in number theory.

Education

University of Michigan, Ph.D. in Mathematics, 2025.
Thesis: Combinatorics of quiver mutations. Advisor: Sergey Fomin.

University of Cambridge, Masters of Advanced Studies in Mathematics (Part III), 2019.
Final Project: Mestre's algorithm for hyperelliptic curves.

University of Utah, B.S. in Computer Science and Mathematics, 2017.
Thesis: The complexity of explaining neural networks through (group) invariants.

Employment

University of Oregon. (9-month) RTG postdoctoral scholar, September 2026–June 2027.

LACIM. Postdoctoral fellow, January–August 2026.

ICERM. Research fellow, September–December 2025.

Mathematical Reviews. Data science consultant, January–April 2024.

Publications and Preprints

1. **Eventual sign coherence** (with A. Burcroff), `arXiv:2605.12865`.
2. **Mysterious points in keys but not trees** (with J. Simental), `arXiv:2603.17890`.
3. **Mutation cycles from reddening sequences** (with T. Ervin), *Ann. Comb.* **30** (2026).
4. **Mutation-acyclic quivers are totally proper**, `arXiv:2409.17832`.
5. **Cyclically ordered quivers** (with S. Fomin), *Adv. Math.* **50** (2026).
6. **On the phase diagram of the polymer model** (with A. Krishnan and S. Mkrtchyan), *J. Theoret. Probab.* **39** 48 (2026).
7. **Long mutation cycles** (with S. Fomin), *Selecta Math.* **31** (2025).
8. **Kostka numbers and longest increasing subsequences** (with A. Krishnan), `arXiv:1907.03881`.
9. **Decision making with limited feedback: Error bounds for recidivism prediction**

[1] Updated October 11, 2026.

and predictive policing (with D. Ensign, S. A. Friedler, C. Scheidegger, and S. Venkatasubramanian), *Proc. Mach. Learn. Res., Algorithmic Learning Theory* **83** (2018), 359–367.

10. **Runaway feedback loops in predictive policing** (with D. Ensign, S. A. Friedler, C. Scheidegger, and S. Venkatasubramanian), *Proc. Conf. Fairness, Accountability, and Transparency* **81** (2018), 160–171.
11. **The complexity of explaining neural networks through (group) invariants** (with D. Ensign, A. Paul, and S. Venkatasubramanian), *Proc. Mach. Learn. Res., Algorithmic Learning Theory* **76** (2017), 341–359. Extended version, *Theoret. Comput. Sci.* **808** (2020), 74–85.
12. **An m-ary partition generalization of a past Putnam problem** (with T. B. Flowers and J. A. Sellers), *Australas. J. Combin.* **72** (2018), 369–375.

Research and Teaching Experiences

University of Oregon

- 9-month RTG postdoctoral scholar, September 2026–June 2027. Supervisor: Patricia Hersh. Research topic: Inverse problems for totally positive spaces.
- Instructor, Math 101: Introduction to Mathematical Modeling (Fall 2026, 2 sections).

ICERM

- Research Fellow, September–December 2025. Mentor: José Simental. "Categorification and Computation in Algebraic Combinatorics" semester program.

LACIM

- Postdoctoral Fellow, January–August 2026. Mentor: Hugh Thomas. Research topic: Generalizing mutation invariants to skew-symmetrizable matrices.

Mathematical Reviews

- Data science consultant (Rackham internship), January–April 2024. Supervisor: Erol Ozil. Project: Exploring machine learning approaches to automated MSC identifier assignment.

University of Michigan

- Instructor, Math 115: Calculus I (Winter 2020, Fall 2023).
- Instructor, Math 105: Data, Functions, and Graphs (Fall 2019, Fall 2022).
- Teaching Assistant, Michigan Math and Science Scholars: Graph Theory (Summer 2022).
- Lab Instructor, Math 215: Multivariable and Vector Calculus (Fall 2021).
- Grader, Math 481: Intro. to Mathematical Logic, and Math 596: Complex Analysis (Fall 2020).

University of Utah

- Research assistant, January–July 2018. Supervisor: Aditya Bhaskara. Research topic: Studying robustness in high rank tensor decomposition.
- Research Experience for Undergraduates, January–May 2016. Supervisor: Tommaso de Fernex. Research topic: Exploring tropical calculus and the log canonical threshold.
- Research Experience for Undergraduates, Nov. 2013–Apr. 2016. Supervisor: Duncan Metcalfe. Project: Created software to analyze the radiocarbon dating curve.

Conferences and Seminar Talks

- *Sumner B Myers Colloquium,* University of Michigan, September 2026.
  Title: **Combinatorics of quiver mutations**.
- *Algebraic and Enumerative combinatorics seminar*, University of Waterloo, June 2026.
  Title: **Eventual Sign Coherence**.
- *Auslander Centennial Conference*, Woods Hole Oceanographic Institute, April 2026.
  Title: **Mutation invariants for exceptional sequences**.
- *LACIM Seminar*, UQAM, January 2026.
  Title: **Forks and Frozens**.
- *ICERM Machine Learning Seminar*, Brown University, October 2025.
  Title: **Finding quiver mutation invariants**.
- *2025 CMS Summer Meeting*, Université Laval, June 2025.
  Title: **Cyclically ordered quivers**.
- *Combinatorics and Graph Theory seminar*, Michigan State University, April 2025.
  Title: **Long mutation cycles**.
- *Graduate Student Combinatorics Conference*, University of Southern California, March 2025.
- *AMS Sectional Meeting: Mutation and cluster algebras*, Clemson, March 2025.
  Title: **The Markov Invariant**.
- *UCLA Combinatorics Forum*, UC Las Angeles, December 2024.
- *Algebra-topology seminar*, University of Alabama, November 2024.
- *Paris algebra seminar*, Paris, October 2024.
- *Combinatorics seminar*, University of Washington, October 2024.
- *Combinatorics seminar*, University of Minnesota, October 2024.
- *Combinatorics seminar*, University of Michigan, September 2024.
- *Richard P. Stanley Seminar in Combinatorics*, Harvard/MIT, September 2024.
- *LACIM Seminar*, UQAM, Canada, September 2024.
  Title: **Cyclically ordered quivers**.
- *Algebraic Geometry Seminar*, UC Davis, February 2024.
- *AMS Sectional Meeting: Cluster algebras, positivity and related topics*, Cincinnati, April 2023.
  Title: **Long mutation cycles**.
- *International Conference on Algorithmic Learning Theory*, Lanzarote, Spain, October 2018.
  Title: **Feedback loops in automated decision making**.
- *International Conference on Algorithmic Learning Theory*, Kyoto, Japan, October 2017.
  Title: **The complexity of explaining neural networks through (group) invariants**.

Student Seminar Talks

Graduate Student Combinatorics Seminar, University of Michigan:

- February 2020. Title: **Longest increasing subsequences and Kostka numbers**.
- December 2020. Title: **The RSK algorithm for longest paths**.
- March 2021. Title: **Quiver (mutation) invariants**.

- September 2021. Title: **CC systems and vortex-free tournaments**.
- January 2022. Title: **Some colourful convexity theorems**.
- November 2022. Title: **Sets that are (NP) hard to count**.
- January 2023. Title: **RSK**.
- September 2023. Title: **Mutation graphs**.
- January 2024. Title: **Long mutation cycles**.
- September 2024. Title: **Acyclic quivers and admissible quasi-Cartan companions**.
- February 2025. Title: **The Markov equation**.

Algebraic Combinatorics Learning Seminar, University of Michigan:

- March 2024. Title: **Examples with combinatorial Chow rings**.
- February 2023. Title: **Deciding the vanishing of Schubert Polynomial Coefficients**.
- March 2022. Title: **Computing cluster cohomology**.

Pre-seminars: MIT (September 2024), Minnesota (October 2024), Washington (October 2024), ICERM (October 2025), Lacim (January 2026), Waterloo (June 2026).

Posters: Combinatorial Algebra meets Algebraic Combinatorics (January 2026), Category Theory, Combinatorics, and Machine Learning workshop at ICERM (September 2025), Undergraduate Research Symposium at University of Utah (2016).

Professional Service and Outreach

- Referee, *Electronic Journal of Combinatorics*, *Annals of Combinatorics*, *Journal of Pure and Applied Algebra*, *Journal of Algebra*.
- Mentor, LACIM internships (2026).
  Co-mentored 2 undergraduate students to add quiver mutations to Lean.
- Co-organizer, LEAN at LACIM (2026).
  Weekly learning seminar on Lean 4.
- Co-organizer, Machine learning seminar at ICERM, (2025).
  Weekly training seminar on machine learning topics and techniques.
- Member, Graduate Student Advisory Committee (2021–2025).
  Organized trainings and outreach events for the mathematics department, advised on and proposed graduate program policy, represented graduate students on department climate issues.
- Co-organizer, UM Student Combinatorics Seminar (2021–2024).
  Graduate student seminar in combinatorics, for learning new material and practice giving talks.
- Member, Michigan Research Experience for Graduates Committee (2022).
  Helped draft grant proposals, recruited mentors for summer research program.
- Mentor, Directed Reading Program (2022).
  Read Silverman's *The Arithmetic of Elliptic Curves* with an undergraduate mentee.

Awards and Distinctions

- Sumner B. Myers award (Math department's Best Thesis of 2025).
- Rackham Predoctoral Fellowship (2024-2025).
- Pat Shure Excellence in Teaching Award (2024).

- NSF RTG Research Assistant (Winter 2022, Winter 2023).
- Honored Instructor, Michigan Housing (Fall 2022).
- Winston Churchill Scholarship (2018).
- Honorable mention, Outstanding Undergraduate Researcher Award for Ph.D.-granting institutions, Computing Research Association (2018).
- Honorable mention, Mathematical Contest in Modeling (2015–2016).
- First place, Undergraduate Problem Solving Contest, Math Department, University of Utah (2015).
- Dean's List, College of Science, University of Utah (2014–2017).