

Galen Dorpalen-Barry

Curriculum Vitae

Academic positions

- Starting 9/2023 Postdoctoral Scholar (RTG),
Department of Mathematics, University of Oregon
Mentor: Nicholas Proudfoot
- 10/2021 – 9/2023 Postdoctoral Researcher (Wissenschaftlicher Mitarbeiter),
Algebraic Combinatorics Group, Faculty for Mathematics, Ruhr-University Bochum
Mentor: Christian Stump

Education

- 9/2018 – 7/2021 PhD in Mathematics, University of Minnesota
Thesis: *Cones of Hyperplane Arrangements*, Advisor: Victor Reiner
- 9/2015 – 9/2018 Masters of Mathematics, University of Minnesota
Thesis: *Whitney Numbers for Poset Cones*, Advisor: Victor Reiner
- 9/2011 – 5/2015 Bachelor of Arts in Mathematics, Bard College
Thesis: *Rational Tilings of the Unit Square*, supervised by John Cullinan

Papers & Preprints

- 2023 “A Three-Regime Theorem for Flow-Firing,” with Sarah Brauner, Selvi Kara, Caroline Klivans, and Lisa Schneider; arXiv:2303.02526 (submitted)
- 2023 “The Poincaré-extended \mathbf{ab} -Index,” with Joshua Maglione and Christian Stump; arXiv:2301.05904 (submitted)
- 2023 “Equivariant cohomology and conditional oriented matroids,” with Nicholas Proudfoot and Jidong Wang, *International Math Research Notices* (to appear)
- 2023 “The Varchenko-Gel’fand Ring of a Cone,” *Journal of Algebra*
- 2022 “Shi Arrangements Restricted to Weyl Cones,” with Christian Stump; arXiv 2104.02740, *submitted*
- 2022 “Filtering cohomology of ordinary and Lagrangian Grassmannians” with Victor Reiner and the students of the Polymath Jr. REU, *Involve*.
- 2021 “Whitney Numbers for Poset Cones,” with Jang Soo Kim and Victor Reiner; *Order*.

- 2021 “Elser’s Gaussian-cluster percolation model” (with Cyrus Hettle, David C. Livingston, Jeremy L. Martin, George Nasr, Julianne Vega, Hays Whitlatch); *Journal of Combinatorial Theory, Series A*.
- 2020 “Enumerating Parking Completions Using Join and Split” (with Ayomikun Adeniran, Steve Butler, Pamela E. Harris, Cyrus Hettle, Qingzhong Liang, Jeremy L. Martin, and Hayan Nam); *Electronic Journal of Combinatorics*.

Awards

- 2023–2025 AIM SQuaRE Collaboration Grant (Topic: “Positroid Polytopes”)
- 2021–2022 ICERM Semester Fellowship through the *Research Community in Algebraic Combinatorics*

Selected Talks

* indicates an invited talk.

- 5/2023 Texas A&M Colloquium, “Cones of Hyperplane Arrangements”
- 3/2023 89th Séminaire Lotharingien de Combinatoire, “The Poincaré-extended **ab**-index”
- 3/2023 Various Guises of Reflection Arrangements (Edinburgh, UK), “The Poincaré-extended **ab**-index” (Invited Participant)
- 2/2023 Discrete CATS Seminar at the University of Kentucky, “The Poincaré-extended **ab**-index”
- 9/2022 Geometry Meets Combinatorics in Bielefeld*, “Real Hyperplane Arrangements and the Varchenko-Gelfand Ring”
- 6/2022 Arrangements in Lugano*, “Real Hyperplane Arrangements and the Varchenko-Gelfand Ring”
- 3/2022 Combinatorial Coworkspace*, “Narayana numbers from the geometry of Shi arrangements”
- 5/2020 Arrangements at Home*, “The Varchenko-Gel’fand Ring of a Cone”
- 10/2019 AMS Eastern Special Session “Oriented matroids and related topics,” Binghamton, NY
Talk: A positivity phenomenon in Elser’s Gaussian-cluster percolation model
- 9/2019 AMS Central Special Session*, “Algebraic and Geometric Combinatorics”
Talk: Whitney Numbers for Poset Cones
- 7/2019 SIAM Conference on Applied Algebraic Geometry at the University of Bern*, Minisymposium: “New Developments in Matroid Theory”
Talk: Whitney Numbers for Poset Cone
- 4/6/2019 Graduate Student Combinatorics Conference (GSCC 2019) at Penn-Drexel
Talk: “Hyperplane Arrangements and Poset Cones - *Another* Catalan Story”
- 3/2019 Discrete CATS Seminar at the University of Kentucky
Talk: Whitney Numbers for Poset Cones

- 2/2019 Gig'Em 2019 at Texas A & M University
Talk: "q the music: a short introduction to q-analogues through q-binomial coefficients"
- 2/2019 Combinatorics and Algebra Seminar at Texas A & M University
Talk: "Whitney Numbers for Cones"
- 9/2018 Combinatorial Geometries 2018, CIRM, France
Talk: "Characteristic polynomials and chambers for cones in hyperplane arrangements"
- 5/2018 Graduate Research Workshop in Combinatorics
Problem Presented: "Non-negativity of Elser's Invariant"

Seminar and Conference Organization

- 10/2022 – 7/2023 Oberseminar "Kombinatorik" at RUB (with Christian Stump)
- 10/2021 – 7/2022 Oberseminar "Arrangements and Symmetries" at RUB (with Georges Neaime, Gerhard Röhrle, and Christian Stump)
- 10/2021 – 7/2022 Bochum-Frankfurt Joint Oberseminar "Kombinatorik" (with Raman Sanyal, Christian Stump)
- 4/2021 Graduate Student Combinatorics Conference (organized with Esther Banaian, Sarah Brauner, Elizabeth Kelley, Eric Nathan Stucky, Lilly Webster)
(This conference received an NSA grant for 25,000 USD, but the conference was moved online due to COVID-19, and the grant was returned.)
- 4/2020 – 5/2021 Graduate Online Combinatorics Colloquium (organized with Alex McDonough and Andrés Vindas-Meléndez)
- 9/2017 – 6/2018 Student Combinatorics Seminar at Minnesota with Elizabeth Kelley, University of Minnesota

Outreach & Mentoring

- 6/2020 – 8/2020 Polymath Jr. Research Experience for Undergraduates (REU)
Assistant Mentor for the project: "Filtering cohomology of ordinary and Lagrangian Grassmannians," which was proposed by Victor Reiner
- 1/2020 Mathematics Project at Minnesota (MPM), Mentor
- 1/2020 – 5/2020 Directed Reading Program, Project Mentor
Topic: "Cyclotomic Polynomials"
- 9/2019 – 5/2019 Women in Science and Engineering (WiSE), Mentor
- 5/2017 – 8/2017 University of Minnesota Research Experience for Undergraduates (REU)
Teaching assistant for two projects: "Supports of skew Schur functions" and "Correlations among patterns," both proposed by Pavlo Pylyavskyy.

Reviews

- Advances in Applied Mathematics
- Communications in Algebra
- Discrete and Computational Geometry

- European Journal of Combinatorics
- Minnesota Journal of Undergraduate Mathematics

Teaching

- 10/2022 – 2/2023 Introduction to Combinatorics (Instructor of Record) (Ruhr-Universität Bochum)
- 4/2022 – 7/2022 Math 2 for Computer Science (Ruhr-Universität Bochum)
- 10/2021 – 2/2022 Math 1 for Computer Science (Ruhr-Universität Bochum)
- 9/2020 – 12/2020 Math 2263: Multivariable Calculus (Lecturer) (University of Minnesota)
- 5/2019 – 12/2019 Math 1031: College Algebra and Probability (University of Minnesota)
- 5/2018 – 12/2018 Math 2573: Honors Calculus III (Multivariable Calculus) (University of Minnesota)
- 5/2017 – 12/2017 Math 1272: CLA Calculus II
- 1/2017 – 5/2017 Math 2374: CSE Multivariable Calculus (University of Minnesota)
- 9/2015 – 12/2015 Math 2373: CSE Linear Algebra and Differential Equations (University of Minnesota)
- 1/2016 – 5/2016 Math 2373: CSE Linear Algebra and Differential Equations (University of Minnesota)
- 9/2015 – 12/2015 Math 1142: Short Calculus (University of Minnesota)