

Christopher Eur

Curriculum Vitae

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Employment

- Jul 2021 – **Harvard University, NSF / Benjamin Peirce postdoctoral fellow.**
present Sponsoring scientist: Lauren Williams
- Aug 2020 – **Stanford University, NSF postdoctoral fellow.**
Jun 2021 Sponsoring scientist: June Huh

Education

- Aug 2015 – **University of California Berkeley, Ph.D. in mathematics.**
May 2020 Advisor: David Eisenbud, Thesis: *The Geometry of Divisors on Matroids*
- Aug 2011 – **Harvard University, B.A. in mathematics.**
May 2015 Advisor: Melody Chan, Thesis: *A Brief Introduction to Toric Varieties*

Research Interests

Interplay between algebraic geometry and combinatorics, particularly in the context of matroids and their generalizations to arbitrary Lie types.

Publications

Reciprocal maximum likelihood degrees of diagonal linear concentration models

with Tara Fife, Jose Samper, and Tim Seynnaeve
Le Matematiche **76** (2021). [arXiv:2011.14182](https://arxiv.org/abs/2011.14182)

Reciprocal maximum likelihood degrees of Brownian motion tree models

with Tobias Boege, Jane Ioy Coons, Aida Maraj, and Frank Röttger
Le Matematiche **76** (2021). [arXiv:2009.11849](https://arxiv.org/abs/2009.11849)

Tropical flag varieties

with Madeline Brandt and Leon Zhang
Advances in Mathematics **384** (2021). [arXiv:2005.13727](https://arxiv.org/abs/2005.13727)

K-theoretic Tutte polynomials of morphisms of matroids

with Rodica Dinu and Tim Seynnaeve
Journal of Combinatorial Theory, Series A **181** (2021). [arXiv:2004.00112](https://arxiv.org/abs/2004.00112)

The Universal valuation of Coxeter matroids

with Mario Sanchez and Mariel Supina
Bulletin of London Mathematical Society **53** (2021). [arXiv:2008.01121](https://arxiv.org/abs/2008.01121)

Free resolutions of function classes via order complexes

with Justin Chen, Greg Yang, and Mengyuan Zhang

[Advances in Applied Mathematics](#) **120** (2020). [arXiv:1909.02159](#)

Logarithmic concavity for morphisms of matroids

with June Huh

[Advances in Mathematics](#) **367** (2020). [arXiv:1906.00481](#)

Coxeter submodular functions and deformations of Coxeter permutohedra

with Federico Ardila, Federico Castillo, and Alex Postnikov

[Advances in Mathematics](#) **365** (2020). [arXiv:1904.11029](#), [FPSAC abstract](#)

Divisors on matroids and their volumes

[Journal of Combinatorial Theory, Series A](#) **169** (2020). [arXiv:1803.07103](#), [FPSAC abstract](#)

Complete intersections of a given Hilbert polynomial

with Sung Hyun Lim

[Journal of Commutative Algebra](#) **13** (2021). [arXiv:1712.05886](#)

Preprints

Tautological classes of matroids

with Andrew Berget, Hunter Spink, and Dennis Tseng

submitted. [arXiv:2103.08021](#)

GKM Varieties: a Macaulay2 package

with Ritvik Ramkumar

[Documentation page](#), [GitHub link](#)

Simplicial generation of Chow rings of matroids

with Spencer Backman and Connor Simpson

submitted. [arXiv:1905.07114](#), [FPSAC abstract](#)

Awards

- 2020 NSF Postdoctoral Fellowship
- 2020 Ribet–Goldberg Award in Algebra
- 2019 FPSAC Best student paper award
- 2019 UC Dissertation-year fellowship
- 2017 Outstanding Graduate Student Instructor (OGSI) Award
- 2014, 2015 Derek Bok Certificate of Distinction for Excellence in Teaching

Invited Talks

- 7/26 ~ 8/5 *TBD*. LMS-Bath Symposium on Combinatorial Algebraic Geometry. (Online)
2021

- 6/21/2021 *Tautological bundles of matroids*. Oberwolfach Workshop: Classical Algebraic Geometry. (Hybrid-online)
- 4/12/2021 *Tautological classes of matroids*. ICERM Workshop: Algebraic Geometry and Polyhedra. (Online)
- 3/14/2021 *Tautological bundles of matroids*. AMS Special Session on Tropical Geometry, F1-connections and Matroids. (Online)
- 2/2/2021 *Introduction to Lorentzian polynomials*. ICERM Introductory Workshop: Combinatorial Algebraic Geometry. (Online)
- 12/10/2020 *Tautological Bundles of matroids*. Online Nottingham algebraic geometry seminar.
- 9/12/2020 *Free resolutions in learning theory*. AMS Special Session on Free resolutions, combinatorics, and geometry. (Online)
- 3/17/2020 *Simplicial generation of Chow rings of matroids*. Unimodality, Log-concavity and beyond. Mittag-Leffler Institute, Sweden. (Online video talk)
- 1/18/2020 *Towards a tropical geometry of Coxeter matroids*. AMS Special Session on Representations of Finite Groups and Related Structures, JMM 2020 Denver, CO.
- 11/15/2019 *Simplicial generation of Chow rings of matroids*. Combinatorics and geometry seminar, University of Washington.
- 11/13/2019 *Simplicial generation of Chow rings of matroids*. Combinatorics seminar, University of Minnesota.
- 10/28/2019 *On geometrically distinguished divisors on matroids*. Commutative Algebra and Lattice Polytopes. RIMS, Kyoto University, Japan.
- 10/12/2019 *Simplicial generation of Chow rings of matroids*. AMS Special session on Oriented matroids and related topics, Binghamton University.
- 9/27/2019 *Simplicial generation of Chow rings of matroids*. Harvard/MIT combinatorics seminar
- 9/20/2019 *Simplicial generation of Chow rings of matroids*. University of Michigan
- 9/16/2019 *Log-concavity for morphisms of matroids*. UC Berkeley combinatorics seminar
- 9/12/2019 *Simplicial generation of Chow rings of matroids*. Notre Dame University
- 7/1/2019 *Divisors on matroids and their volumes*. 31st International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC). Ljubljana, Slovenia.
- 3/4/2019 *Chow rings of matroids, matroids quotients, and beyond*. Algebra seminar, Georgia Institute of Technology.
- 3/1/2019 *Chow rings of matroids, matroids quotients, and beyond*. Algebra and algebraic geometry seminar, University of Wisconsin-Madison.
- 10/27/2018 *Divisors on matroids and their volumes*. AMS Special Session on Algebraic Geometry, San Francisco State University.
- 10/21/2018 *Divisors on matroids and their volumes*. AMS Special Session on Multiplicities and Volumes: An Interplay Among Algebra, Combinatorics, and Geometry, University of Michigan Ann Arbor.
- 10/18/2018 *Divisors on matroids and their volumes*. Geometry, Combinatorics and Integrable Systems Seminar, Ohio State University
- 4/20/2018 *Divisors on matroids and their volumes*. Commutative algebra seminar, University of Utah.

- 4/15/2018 *Complete intersections of a given Hilbert polynomial*. AMS Special Session on Commutative Algebra, Portland State University.
- 3/12/2016 *Examination of the proof, Part 3*. Workshop on the Global Attractor Conjecture with invited guest Gheorghe Craciun, San Jose State University.
- 1/15/2016 *Toric dynamical systems*. Workshop on the Global Attractor Conjecture: Seminar on Mathematics of Biochemical Reaction Systems, UC Berkeley.

Conferences/Seminars Organized

- 4/10/2021 *Bay Area Discrete Math Day (BADMath Day)*
(with Jessica De Silva, Magda Hlavacek, Isabelle Shankar, Mariel Supina, Foster Tom). UC Berkeley. [website](#), videos hosted at [Simons Institute](#)
- Fall 2018 ~ Spring 2020 *The Fellowship of the ring: CA + AG seminar*,
(main organizer: David Eisenbud). UC Berkeley.
- Fall 2019 *AMS Special Session on Combinatorial Algebraic Geometry*,
9/14 ~ 9/15 (with Juliette Bruce, Daniel Erman, and Lily Silverstein). AMS Fall Central Sectional Meeting, University of Wisconsin–Madison. [AMS website](#)
- Fall 2018 *Student Algebraic Geometry Seminar: algebraic surfaces*. UC Berkeley. [website](#)
- Spring 2018 *Student Algebraic Geometry Seminar: toric geometry*. UC Berkeley. [website](#)
- Fall 2017 *Student Commutative Algebra Seminar*. UC Berkeley.
- Fall 2016 *Student Commutative Algebra Seminar*. UC Berkeley. [website](#)

Outreach

- 2016–2020 Board member in *Unbounded Representation (URep)*, a graduate student group promoting diversity in mathematics.
- 2013-2015 Publicity chair for *Harvard Applied Math Society* (SIAM: Harvard Chapter)

Teaching

Graduate Student Instructor (GSI) at University of California at Berkeley:

- Spring 2019 Math 54: Linear Algebra and Differential Equations
- Fall 2017 Math 54: Linear Algebra and Differential Equations
- *Spring 2017 Math 54: Linear Algebra and Differential Equations
- *Fall 2016 Math 54: Linear Algebra and Differential Equations
- Spring 2016 Math 53: Multivariable Calculus
- Fall 2015 Math 1A: Calculus I

**Outstanding Graduate Student Instructor Award*

Mentor for the Directed Reading Problem (DRP) at UC Berkeley:

- Spring2020 Topic: Algebraic geometry by problem-solving
- Fall 2018 Topic: Rank functions of symplectic matroids
- Spring 2017 Topic: Divisors on chain-of-loops graphs
- Fall 2016 Topic: Divisors on metric graphs
- Fall 2015 Topic: elliptic curves and applications to cryptography

Course Assistant at Harvard University:

[†]Spring 2015 Math 110: Introduction to Fourier Series

[†]Fall 2014 Math 152: Discrete Mathematics

[†]Spring 2014 Math 110: Introduction to Fourier Series

Fall 2013 Math 23a: Linear Algebra and Real Analysis

Fall 2013 Math 1b: Calculus and Differential Equations

[†]*Derek Bok Certificate of Distinction for Excellence in Teaching*