

Yulia Alexandr

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Research interests algebraic statistics, nonlinear algebra, information geometry, convex geometry

Employment **University of California, Los Angeles** Jan 2024–Jun 2026
Hedrick Assistant Adjunct Professor
Mentor: Guido Montúfar

Education **University of California, Berkeley** 2019–2023
PhD in Mathematics
Advisors: Bernd Sturmfels and Serkan Hoşten
Thesis: *From Voronoi Cells to Algebraic Statistics*

Wesleyan University Class of 2019
BA in Mathematics with High Honors, class rank: 1
Advisor: Karen Collins
Thesis: *Combinatorial Nullstellensatz: Various Proofs, Extensions & Applications*

Awards and fellowships NSF Graduate Research Fellowship 2020
Chancellor's Graduate Fellowship (UC Berkeley) 2019
Phi Beta Kappa (Connecticut Gamma Chapter) 2019
Rice Prize (Wesleyan University) 2019
awarded to a senior for excellence in mathematics
Rae Shortt Prize (Wesleyan University) 2018
awarded to a junior for excellence in mathematics
Twin Cities REU at the University of Minnesota 2018
DIMACS REU at Rutgers University and Charles University (Prague) 2017
Treespace REU at Lehman College 2016

Papers **Maximum information divergence from linear and toric models**
with Serkan Hoşten.
Submitted. Available on [arXiv](#), 2023.

Moment varieties for mixtures of products
with Joe Kileel and Bernd Sturmfels.
Published in Proceedings of the *International Symposium on Symbolic and Algebraic Computation (ISSAC 2023)*, ACM, New York, 2023, 53–60.

Decomposable context-specific models
with Eliana Duarte and Julian Vill.
Submitted. Available on [arXiv](#), 2022.

Logarithmic Voronoi cells for Gaussian models

with Serkan Hoşten.

To appear in *Journal of Symbolic Computation* **122** (2024).

Logarithmic Voronoi polytopes for discrete linear models

Published in *Algebraic Statistics* **15** (2024) no. 1, 1–13.

Logarithmic Voronoi cells

with Alexander Heaton.

Published in *Algebraic Statistics* **12** (2021), no. 1, 75–95.

Computing a logarithmic Voronoi cell

with Alexander Heaton and Sascha Timme.

Published online at [HomotopyContinuation.jl](#), 2019.

Recovering conductances of resistor networks in a punctured disk

with Brian Burks, Sunita Chepuri, and Patricia Commins.

Preprint. Available on [arXiv](#), 2019.

Deformations of the Weyl character formula for $SO(2n + 1, \mathbb{C})$ via ice models

with P. Commins, A. Embry, S. Frank, Y. Li, and A. Vetter.

Preprint. Available on [arXiv](#), 2018.

Growth of meandric numbers

with Kayla Cummings and Edgar Jaramillo Rodriguez.

Transcription in *DIMACS-DIMATIA REU booklet (pp. 33–36)*, 2017.

Teaching

Instructor (UCLA)

PIC 10A: Introduction to Programming

Winter 2024

Graduate student instructor (UC Berkeley)

MATH 10B: Methods of mathematics

Spring 2023

MATH 54: Linear algebra and differential equations

Fall 2022

Directed reading program mentor (UC Berkeley)

Topics: algebraic combinatorics and graph theory

Spring 2020

Teaching assistant (Wesleyan University)

MATH 231: Probability theory

Fall 2018

MATH 274: Graph theory

Spring 2018

MATH 231: Probability theory

Fall 2017

key: ★=invited/colloquium; †=contributed; △=seminar/lecture.

Moment varieties for mixtures of products

- † International Symposium on Symbolic and Algebraic Computation (ISSAC)
in Tromsø July 2023
- ★ AMS special session on mathematics in data science at Spring Western sectional meeting May 2023
- ★ SFSU Algebra, Geometry, and Combinatorics day March 2023

Computing logarithmic Voronoi cells

- ★ AMS special session on polynomial systems, homotopy continuation and applications at the JMM January 2023

Decomposable context-specific models

- ★ CEG Workshop in Warwick (virtual) September 2022

Logarithmic Voronoi Cells

- ★ Naval Postgraduate School in Monterey CA June 2023
- ★ Santa Clara University math and CS colloquium October 2022
- △ Discrete Math & Geometry seminar at TU-Berlin (virtual) October 2022
- △ SFSU Algebra, Geometry, and Combinatorics Seminar October 2021
- △ Berkeley Combinatorics Research Seminar (virtual) April 2021
- △ Nonlinear Algebra Seminar Online (virtual) April 2020

Logarithmic Voronoi polytopes

- △ Mathematical Methods in Data Analysis in Tirana, Albania July 2022

Combinatorics of logarithmic Voronoi cells

- △ Algebra and Geometry seminar at University of Magdeburg July 2022

Logarithmic Voronoi cells for Gaussian models

- ★ SIAM Conference on Applied Algebraic Geometry in Eindhoven July 2023
- † Effective Methods in Algebraic Geometry in Kraków, Poland June 2022
- △ Applied CATS seminar at KTH (virtual) May 2022

Logarithmic Voronoi polytopes for discrete linear models

- † Algebraic Statistics at the University of Hawai'i at Manoa May 2022
- ★ AMS Spring Central Sectional Meeting (virtual) March 2022

Introduction to SAGE

- † Mathematical computing virtual workshop by UCB and UBC Apr 2022

Linear Spaces and Grassmannians

- △ Nonlinear Algebra course at MPI MiS (Leipzig, Germany) June 2019

	<i>Caratheodory, Radon, and Helly theorems in convex geometry</i> △ Minicourse on Convex Geometry at MPI MiS (Leipzig, Germany) July 2021	
	<i>Ice Models for Types A and B</i> (two talks) △ Berkeley Combinatorics Reading Seminar	October 2019
	<i>Combinatorial Nullstellensatz</i> Wesleyan University Thesis Defense	January 2019
	<i>Visibility Graphs of Staircase Polygons</i> † Berkeley Undergraduate Number Theory Conference	April 2018
Visiting positions	Institute for Mathematical and Statistical Innovation Visiting student for <i>Algebraic Statistics and Our Changing World</i>	Sep–Dec 2013
	Max Planck Institute for Mathematics in the Sciences Summer visitor	2019, 2021, 2022
Skills	Programming Macaulay2, SAGE, Mathematica, Singular, C, C++, \LaTeX , OCaml, SML, HTML, Python, Julia Languages English (native), Russian (native), Hebrew (intermediate)	
Service and outreach	Berkeley nonlinear algebra seminar , co-organizer STEMinist club, invited speaker, <i>Berkeley High School</i> Noetherian Ring, member, <i>UC Berkeley</i> Math Club graduate school panel, panelist, <i>Wesleyan University</i> Directed reading program (DRP), mentor, <i>UC Berkeley</i> Unbounded Representation (URep), officer, <i>UC Berkeley</i>	Fall 2022 Nov 2021 2019–present 2020 2020 2019–2020