

Yulia Alexandr

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Research interests	algebraic statistics, applied algebra, mathematical machine learning	
Employment	University of California, Los Angeles	Jan 2024–Jun 2026
	Hedrick Assistant Adjunct Professor	
	Mentor: Guido Montúfar	
	Harvard University	Jun–Sep 2025
	Postdoctoral Fellow	
	Mentor: Anna Seigal	
Education	University of California, Berkeley	2019–2023
	PhD in Mathematics	
	Advisors: Bernd Sturmfels and Serkan Hoşten	
	Thesis: <i>From Voronoi Cells to Algebraic Statistics</i>	
	Wesleyan University	Class of 2019
	BA in Mathematics with High Honors; class rank: 1	
	Advisor: Karen Collins	
	Thesis: <i>Combinatorial Nullstellensatz: Various Proofs, Extensions & Applications</i>	
Awards and fellowships	AWM travel grant (\$2300)	2024
	UC Berkeley conference travel grant (\$900)	2022
	NSF Graduate Research Fellowship	2020–2023
	Chancellor’s Graduate Fellowship (UC Berkeley)	2019–2020
	Phi Beta Kappa (Connecticut Gamma Chapter)	2019
	Rice Prize (Wesleyan University)	2019
	<i>awarded to a senior for excellence in mathematics</i>	
	Rae Shortt Prize (Wesleyan University)	2018
	<i>awarded to a junior for excellence in mathematics</i>	
	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	New directions in algebraic statistics: three challenges from 2023	
	with M. Bakenhus, M. Curiel, S. K. Deshpande, E. Gross, Y. Gu, M. Hill, J. Johnson, B. Kagy, V. Karwa, J. Li, H. Lyu, S. Petrović, and J. I. Rodriguez. Published in <i>Algebraic Statistics</i> , 15 (2024), no. 2, 357–382.	

Mixtures of discrete decomposable graphical models

with Jane Ivy Coons and Nils Sturma.

Published in *Algebraic Statistics*, **15** (2024), no. 2, 269–293.

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.

Published in *SIAM Journal on Applied Algebra and Geometry* **8** (2024), no. 2, 363-393.

Logarithmic Voronoi cells for Gaussian models

with Serkan Hoşten.

Published in *Journal of Symbolic Computation* **122** (2024) paper no. 102256.

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 10B: Intermediate Programming (C++) Winter, Spring 2025

PIC 10A: Introduction to Programming (C++) Winter, Fall 2024

PIC 16A: Python with Applications I Spring 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

Talks

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

Mixtures of Discrete Decomposable Graphical Models

Δ UW-Madison Applied Algebra Seminar November 2024

Maximum information divergence from linear and toric models

Δ Math Machine Learning seminar MPI MIS + UCLA February 2024

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

Caratheodory, Radon, and Helly theorems in convex geometry

- △ Minicourse on Convex Geometry at MPI MiS (Leipzig, Germany) July 2021

Ice Models for Types A and B (two talks)

- △ Berkeley Combinatorics Reading Seminar October 2019

Combinatorial Nullstellensatz

- Wesleyan University Thesis Defense January 2019

Visibility Graphs of Staircase Polygons

- † Berkeley Undergraduate Number Theory Conference April 2018

Visiting positions

Institute for Mathematical and Statistical Innovation Sep–Dec 2013
 Long-term visitor for *Algebraic Statistics and Our Changing World*

Max Planck Institute for Mathematics in the Sciences 2019, '20, '22, '24
 Summer visitor

Skills

Programming

Macaulay2, SAGE, Mathematica, Singular, \LaTeX ,
C, C++, Python, Julia, OCaml, SML, HTML

Languages

English (native), Russian (native), Hebrew (intermediate)

Service

Organizing

AMS Special Session *Algebraic Statistics In Our Changing World*

AMS Special Session *Algebraic Methods in Machine Learning and Optimization*

co-organizer, *Joint Math Meeting* (JMM 2025) Jan 2025

[Berkeley nonlinear algebra seminar](#), co-organizer Fall 2022

Mentorship and outreach

Women in math mentorship program, mentor, *UCLA* Fall 2024

STEMinist club, invited speaker, *Berkeley High School* Nov 2021

Noetherian Ring, member, *UC Berkeley* 2019–present

Math Club graduate school panel, panelist, *Wesleyan University* 2020

Directed reading program (DRP), mentor, *UC Berkeley* 2020

Unbounded Representation (URep), officer, *UC Berkeley* 2019–2020