

Yulia Alexandr

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Email: yulia@math.berkeley.edu

Office: Evans 1045

Research interests algebraic statistics, nonlinear algebra, convex geometry

Education **University of California, Berkeley** 2019–present
PhD in Mathematics
Advisors: Bernd Sturmfels and Serkan Hoşten
Ph.D. expected: December 2023

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
<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 **Moment varieties for mixtures of products**
with Joe Kileel and Bernd Sturmfels.
to appear in *International Symposium on Symbolic and Algebraic Computation (ISSAC 2023, Tromsø)*.

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

Logarithmic Voronoi cells for Gaussian models
with Serkan Hoşten.
Presented at MEGA 2022 in Kraków, submitted. Available on [arXiv](#), 2022.

Logarithmic Voronoi polytopes for discrete linear models
Submitted. Available on [arXiv](#), 2021.

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](https://arxiv.org/abs/1905.08111), 2019.

Recovering Conductances of Resistor Networks in a Punctured Disk

with Brian Burks, Sunita Chepuri, and Patricia Commins.

REU project. Available on [arXiv](https://arxiv.org/abs/1905.08111), 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.

REU project. Available on [arXiv](https://arxiv.org/abs/1805.08111), 2018.

Growth of Meandric Numbers

with Kayla Cummings and Edgar Jaramillo Rodriguez.

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

Teaching

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; △=seminar/lecture.

Moment varieties for mixtures of products

★ 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
<i>Logarithmic Voronoi Cells</i>	
★ 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
<i>Logarithmic Voronoi polytopes</i>	
△ Mathematical Methods in Data Analysis in Tirana, Albania	July 2022
<i>Combinatorics of logarithmic Voronoi cells</i>	
△ Algebra and Geometry seminar at University of Magdeburg	July 2022
<i>Logarithmic Voronoi cells for Gaussian models</i>	
† Effective Methods in Algebraic Geometry in Kraków, Poland	June 2022
△ Applied CATS seminar at KTH (virtual)	May 2022
<i>Logarithmic Voronoi polytopes for discrete linear models</i>	
† Algebraic Statistics at the University of Hawai'i at Manoa	May 2022
★ AMS Spring Central Sectional Meeting (virtual)	March 2022
<i>Introduction to SAGE</i>	
† Mathematical computing virtual workshop by UCB and UBC	Apr 2022
<i>Linear Spaces and Grassmannians</i>	
△ 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 (two talks)</i>	
△ 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

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	Fall 2022
	STEMinist club, invited speaker, <i>Berkeley High School</i>	Nov 2021
	Noetherian Ring, member, <i>UC Berkeley</i>	2019–present
	Math Club graduate school panel, panelist, <i>Wesleyan University</i>	2020
	Directed reading program (DRP), mentor, <i>UC Berkeley</i>	2020
	Unbounded Representation (URep), officer, <i>UC Berkeley</i>	2019–2020