Yassine El Maazouz

Curriculum Vitae
Current as of September 1, 2026

Mathematics Department
California Institute of Technology
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Citizenship: France and Morocco

Academic Positions

Jan. 2025 – **California Institute of Technology**
Harry Bateman Postdoctoral Scholar Teaching Fellow in Mathematics

03/2024 – 12/2024 **Max Planck Institute for Mathematics in the Sciences**
Postdoctoral Researcher

01/2023 – 03/2024 **RWTH Aachen University**
Postdoctoral Researcher

Education

08/2019–12/2022 **University of California, Berkeley**
Ph.D., Statistics, December 16, 2022
Advisor: Bernd Sturmfels
Thesis: *Non-archimedean Excursions in Probability, Number Theory, Combinatorics and Geometry*

08/2016–08/2019 **École Polytechnique**
B.Sc. in Mathematics

Research Interests

Applied Algebraic Geometry, Commutative Algebra, Algebraic Combinatorics and Tropical Geometry.

Publications and Preprints

Preprints

[4] **C-networks and the planar Ising inverse problem**
With Terrence George. Submitted. arXiv:2606.15082.

[3] **Angular pair-of-pants decompositions of complex varieties**
With Paul Alexander Helminck. Submitted. arXiv:2601.14116.

[2] **How to tropicalize a non-archimedean lattice**
Submitted. arXiv:2512.12127.

[1] **Totally positive skew-symmetric matrices**
With Jonathan Boretsky and Veronica Calvo Cortes. Submitted. arXiv:2412.17233.

Journal Publications

[14] **Gram Matrices for Isotropic Vectors**
With Bernd Sturmfels and Svala Sverrisdóttir. To appear in *Communications in Mathematical Physics*.

[13] **Symplectic Grassmannian description of the Coulomb branch three and four point amplitudes**
With Veronica Calvo Cortes, S. Hegde, and A. Suthar. *Journal of High Energy Physics*. Vol. 12, No. 73, 2025.

[12] **Spinor-Helicity Varieties**
With Anaëlle Pfister and Bernd Sturmfels. *SIAM Journal on Applied Algebra and Geometry*. Vol. 9, No. 4, 2025.

[11] **The positive orthogonal Grassmannian**
With Yelena Mandelshtam. *Le Matematiche*, Special Issue on Positive Geometry, Vol. 80, No. 1, 2025.

[10] **$\mathrm{GL}(n, \mathbb{Z}_p)$-invariant Gaussian measures on the space of p-adic polynomials**
With Antonio Lerario. *Electronic Journal of Probability*, Vol. 30, No. 64, 2025.

[9] **On the topology of the moduli of tropical unramified p-covers**
With Paul Helminck, Felix Röhrle, Pedro Souza, and Claudia Yun. *Selecta Mathematica*, Vol. 31, No. 14, 2025.

[8] **Sampling from p-adic algebraic manifolds**
With Enis Kaya. *SIAM Journal on Applied Algebra and Geometry*, Vol. 9, No. 2, 2025.

[7] **Valued rank metric codes**
With Marvin A. Hahn, Mima Stanojkovski, and Alessandro Neri. *Journal of Algebra and Its Applications*, Vol. 24, No. 4, 2025.

[6] **The Bernoulli clock: probabilistic and combinatorial interpretations of the Bernoulli polynomials by circular convolution**
With Jim Pitman. *Combinatorics, Probability and Computing*, Vol. 33, No. 2, 2024.

[5] **Tropical invariants for binary quintics and reduction types of Picard curves**
With Paul A. Helminck and Enis Kaya. *Glasgow Mathematical Journal*, Vol. 66, No.1, 2024.

[4] **Lines on p-adic and real cubic surfaces**
With Rida Ait El Manssour, Enis Kaya, and Kemal Rose. *Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg*, Vol. 93, No. 2, 2023.

[3] **Bolytrope orders**
With Gabriele Nebe and Mima Stanojkovski. *International Journal of Number Theory*, Vol. 19, No. 5, 2023.

[2] **The Gaussian entropy map in valued fields**
Algebraic Statistics, Vol. 13, No. 1, 2022.

[1] **Orders and Polytropes: Matrix Algebras from Valuations**
With Marvin A. Hahn, Gabriele Nebe, Mima Stanojkovski, and Bernd Sturmfels. *Beiträge zur Algebra und Geometrie*, Vol. 63, No. 3, 2022.

Conference Proceedings

[2] **Totally positive skew-symmetric matrices**
With Jonathan Boretsky and Veronica Calvo Cortes. *Proceedings of the 38th International Conference on Formal Power Series and Algebraic Combinatorics*.

[1] **The positive orthogonal Grassmannian**
With Yelena Mandelshtam. *Proceedings of the 37th International Conference on Formal Power Series and Algebraic Combinatorics*.

Awards and Honors

2026	Caltech Summer Undergraduate Research Fellow project funding — 3/3 proposals funded ($ 24330)
2025	Caltech Conference travel grant ($ 4500)
2022	UC Berkeley conference travel grant ($ 900)
2021	Outstanding Graduate Student Instructor Award
2020	U.C. Berkeley EWJ Gateway Fellowship
2020	SEEDS OCP Foundation Scholarship
2019	École Polytechnique Prix du stage de recherche
2016	French Major Excellence Scholarship
2014	King Mohammed VI Foundation Istihqaq Scholarship

Teaching

California Institute of Technology

Spring 2026	Ma 125: Algebraic Curves
Winter 2026	Ma 190B: Tropical Geometry
Winter 2026	Ma 140B: Introduction to Random Matrix Theory
Spring 2025	Ma 132C: Toric Geometry
Winter 2025	Ma 140B: Probability: Stochastic Processes

RWTH Aachen University

Fall 2023	Local Fields
Spring 2023	Algebraic Groups

University of California, Berkeley (Graduate Student Instructor)

Fall 2022	STAT 134: Concepts of Probability
Spring 2022	STAT 150: Stochastic Processes
Spring 2021	STAT 134: Concepts of Probability
Fall 2020	STAT 201A: Introduction to Probability at an Advanced Level

Spring 2020 STAT 134: Concepts of Probability
Summer 2020 Statistics MA Bridge Program

Advising and Mentoring

- Mentoring Summer Undergraduate Research Fellows at Caltech
  - Phoebe Richter: *Random Poisson partitions of the hyperbolic plane*
  - Ezra Caspary: *Gröbner theory of the symplectic Stiefel manifold*
  - Henry Gustafson: *The positive symplectic Grassmannian* $\mathrm{SpGr}(2, 2n)$
  - Enes Banushi: *Cluster structures in scattering amplitudes*
- Co-mentored graduate students at MPI MiS
  - Svala Sverrisdóttir: *Gram matrices for isotropic vectors*
  - Veronica Calvo Cortes: *Totally positive skew-symmetric matrices*, *Symplectic Grassmannian description of the Coulomb branch three- and four-point amplitudes.*
  - Anaëlle Pfister: *Spinor-Helicity varieties*

Service

Committee work

- Ph.D. algebra qualifying exam jury for Jinzhou Huang (Caltech)
- Ph.D. candidacy exam jury for Zhaoxing Gu (Caltech)
- Ph.D. candidacy exam jury for Shaowu Zhang (Caltech)
- B.A. thesis jury for Ikeda Jun (Caltech)

Refereeing

- Archiv der Mathematik
- Algorithmic Number Theory Symposium XV
- Le Matematiche
- Annals of Probability
- Mathematische Annalen
- International Mathematics Research Notices.

Organizing: Conferences and Seminars

2025 *Information, Geometry & Physics Seminar* at Caltech
2024 *Non-Linear Algebra Seminar* at MPI-MiS
2023 *Mathematics and Decision* Conference at UM6P
2023 *Joint Algebra Seminar* at RWTH Aachen
2022 *Non-Linear Algebra Seminar* at UC Berkeley

Invited Talks

Sampling from p-adic algebraic manifolds
Mar. 2027 Integral Geometry of Algebraic Varieties, ICERM, Brown University
Sep. 2023 SFB TRR-195 Annual Meeting 2023, Saarland University
Mar. 2023 Arithmétique en Plat Pays, KU Leuven

Totally positive skew-symmetric matrices

Jul. 2025 SIAM Conference on Applied Algebraic Geometry 2025

Spinor-Helicity varieties

Oct. 2025 Michigan Interdisciplinary Meeting on Amplitudes: Bridges between Physics & Mathematics University of Michigan

How to tropicalize a non-archimedean lattice?

Oct. 2024 Tropical Geometry: Moduli Spaces and Matroids, Goethe University Frankfurt am Main

May. 2025 Spring Western Sectional Meeting, California Polytechnic State University, San Luis Obispo

The Bernoulli clock: probabilistic and combinatorial interpretations of the Bernoulli polynomials by circular convolution

Feb. 2024 Symposium on Sparsity and Singular Structures 2024

The Gaussian entropy map in valued fields

Aug. 2021 Branching from Number Theory: p-adics in the Sciences, MPI-MiS

Nov. 2019 Buildings, Varieties and Applications, MPI-MiS

Tropical invariants for binary quintics and reduction types of Picard curves

Sep. 2023 Tropical Geometry and its Applications, Durham University

Seminar Talks

C-networks and inverse problem for the planar Ising model

Sep 2026 Combinatorics Seminar, University of Michigan

Sampling from p-adic algebraic manifolds

May 2024 Oberseminar, Osnabrück University

Jul. 2022 Joint Algebra Seminar, RWTH Aachen

Jun. 2022 Algebraic Geometry Seminar, UC San Diego

How to tropicalize a non-archimedean lattice?

Apr. 2025 Algebra and Discrete Math Seminar, University of California, Davis

The Gaussian entropy map in valued fields

Nov. 2021 Geometric Structures Research Seminar, SISSA

Nov. 2019 Buildings, Varieties and Applications, MPI-MiS

The Bernoulli clock: probabilistic and combinatorial interpretations of the Bernoulli polynomials by circular convolution

Sep. 2022 Probability Seminar, UC Berkeley

The positive orthogonal Grassmannian

Jan. 2025 Combinatorics Forum, University of California, Los Angeles

$\mathrm{GL}(n, \mathbb{Z}_p)$-invariant Gaussian measures on the space of p-adic polynomials

Apr. 2023 Algebra and Representation Theory Seminar, University of Cologne
Jul. 2022 Joint Algebra Seminar, RWTH Aachen University

Bolytrope orders

Jan. 2023 Quadratic Forms, Modular Forms, and Applications, Joint Mathematics Meetings

On the topology of the moduli space of prime cyclic covers of genus g curves

Oct. 2023 Algebraic Geometry Seminar, University of Tübingen
Jul. 2022 Non-Linear Algebra Seminar, MPI-MiS

Languages and Programming

Languages:

Tamazight (Native), Arabic (Native), French (Fluent), English (Fluent), German (Beginner)

Programming:

Python, Julia, Macaulay2, Singular, Polymake, SageMath, Magma

References

Prof. Bernd Sturmfels

Director, Max Planck Institute for Mathematics in the Sciences
Professor Emeritus, UC Berkeley
bernd@mis.mpg.de

Prof. Paolo Aluffi

Distinguished Research Professor
Department of Mathematics
Florida State University
aluffi@math.fsu.edu

Prof. Matilde Marcolli

Robert F. Christy Professor of Mathematics and Computing and Mathematical Sciences
California Institute of Technology
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Prof. Yue Ren

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Associate Professor in Algebra
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Prof. Thomas Lam

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