# Eric K. Larson

Brown University	Citizenship: United States
Department of Mathematics	elarson3@gmail.com or eric_larson1@brown.edu
Kassar House	https://www.math.brown.edu/elarso19/
Providence, RI USA	Last Updated: April 25, 2025

#### Employment

- 2021 Assistant Professor, Brown University
- 2020 2021 Assistant Professor, University of Washington in Seattle
- 2018 2020 Szego Assistant Professor and NSF Postdoctoral fellow, Stanford University

#### **EDUCATION**

- 2013 2018 Ph.D. Pure Mathematics, Massachusetts Institute of Technology Advisor: Joe Harris (Harvard University)
- 2009 2013 A.B. Mathematics, Harvard University, summa cum laude

### SELECTED AWARDS AND GRANTS

- 2022 2025 NSF Standard Grant DMS-2200641 (PI): "The Geometry of Curves in Projective Space via Degeneration and Deformation", \$224,838
  - 2023 NSF Conference Grant DMS-2312088 (co-PI with Isabel Vogt): "Conference: AGNES Summer School in Algebraic Geometry", \$30,000
  - 2019 Hertz Foundation thesis prize, \$5,000
- 2018 2022 NSF Mathematical Sciences Postdoctoral Research Fellowship DMS-1802908, \$150,000
- 2014 AMS-MAA-SIAM Morgan Prize, \$1,200
- 2013 2018 Hertz Foundation Graduate Fellowship
- 2013 2018 NDSEG Graduate Fellowship
  - 2012 Putnam fellow
  - 2009 Intel Science Talent Search 2009 first place, \$100,000
  - 2009 Siemens Competition second place, \$50,000
  - 2009 International Math Olympiad, gold medal

### $\mathbf{PREPRINTS}^1$

- The integral chow ring of M<sup>ct</sup><sub>2</sub> (with Joseph Helfer, Eric Jovinelly, Anda Tenie, and Chengxi Wang), submitted. arXiv:2503.04912
- 27. Normal bundles of rational curves in Grassmannians (with Izzet Coskun and Isabel Vogt), submitted. arXiv:2404.08102
- 26. The embedding theorem in Hurwitz–Brill–Noether Theory (with Kaelin Cook-Powell, David Jensen, Hannah Larson, and Isabel Vogt), submitted. arXiv:2303.15189
- 25. The Maximal Rank Conjecture, submitted. arXiv:1711.04906

<sup>&</sup>lt;sup>1</sup>The standard in mathematics is that authors are listed alphabetically and all authors are presumed to have made equal contributions.

#### **Referred Publications** / In Press<sup>1</sup>

- 24. On The Cohomology of  $N_C(-2)$  in Positive Characteristic. To appear in Commun. Contemp. Math. arXiv:2308.13756
- 23. The minimal resolution property for points on general curves (with Gavril Farkas). To appear in Ann. Sci. Éc. Norm. Supér. arXiv:2209.11308
- 22. The normal bundle of a general canonical curve of genus at least 7 is semistable (with Izzet Coskun and Isabel Vogt). To appear in *J. Eur. Math. Soc.* arXiv:2203.13211
- Global Brill-Noether theory over the Hurwitz space (with Hannah Larson and Isabel Vogt). To appear in *Geometry and Topology*. arXiv:2008.10765
- Generic Beauville's Conjecture (with Izzet Coskun and Isabel Vogt). Forum of Math Sigma 12 (2024), e51. arXiv:2307.04730
- Stability of Tschirnhausen Bundles (with Izzet Coskun and Isabel Vogt). Int. Math. Res. Not. Vol. 2024 (2024), Issue 1. arXiv:2207.07257
- Interpolation for Brill-Noether curves (with Isabel Vogt). Forum of Math Pi 11 (2023), e25. arXiv:2201.09445
- 17. Constructing reducible Brill-Noether curves II. Manuscripta Math. 172 (2023), 75-88. arXiv:1711.02752
- 16. Constructing reducible Brill-Noether curves. Documenta Math. 27 (2022), 1953–1983. arXiv:1603.02301
- Stability of normal bundles of space curves (with Izzet Coskun and Isabel Vogt). Algebra Number Theory 16 (2022), no. 4, 919–953. arXiv:2003.02964
- 14. The generality of a section of a curve. J. Lond. Math. Soc. (2) 104 (2021), no. 2, 886–925. arXiv:1605.06185
- Interpolation for curves in projective space with bounded error. Int. Math. Res. Not. IMRN 2021, no. 15, 11426–11451. arXiv:1711.01729
- 12. Interpolation for Brill–Noether curves in  $\mathbb{P}^4$  (with Isabel Vogt). Eur. J. Math. 7 (2021), no. 1, 235–271. arXiv:1708.00028
- 11. The integral Chow ring of  $\overline{M}_2$ . Algebr. Geom. 8 (2021), no. 3, 286–318. arXiv:1904.08081
- 10. The maximal rank conjecture for sections of curves. J. Algebra 555 (2020), 223–245.
- Interpolation for normal bundles of general curves (with Atanas Atanasov and David Yang). Mem. Amer. Math. Soc. 257 (2019), no. 1234, v+105 pp. arXiv:1509.01724
- Interpolation for restricted tangent bundles of general curves. Algebra Number Theory 10 (2016), no. 4, 931–938. arXiv:1511.04480
- Integrality properties of the CM-values of certain weak Maass forms (with Larry Rolen). Forum Math. 27 (2015), no. 2, 961–972. arXiv:1107.4114
- Determinants of subquotients of Galois representations associated with abelian varieties (with Dmitry Vaintrob and with an appendix by Brian Conrad). J. Inst. Math. Jussieu 13 (2014), no. 3, 517–559. arXiv:1110.0255
- On the surjectivity of Galois representations associated to elliptic curves over number fields (with Dmitry Vaintrob). Bull. Lond. Math. Soc. 46 (2014), no. 1, 197–209. arXiv: 1204.0046

- Upper bounds for the number of number fields with alternating Galois group (with Larry Rolen). Proc. Amer. Math. Soc. 141 (2013), no. 2, 499–503. arXiv:1107.1182
- 3. Progress towards counting  $D_5$  quintic fields (with Larry Rolen). Involve 5 (2012), no. 1, 91–97. arXiv:1107.4111
- 2. The DNA inequality in non-convex regions. Adv. Geom. 10 (2010), no. 2, 221-248. arXiv:0801.1929
- 1. On the classification of certain fusion categories (with David Jordan). J. Noncommut. Geom. 3 (2009), no. 3, 481–499. arXiv:0812.1603

#### Computer Programs

1. Galois Representations for Elliptic Curves over Number Fields, SAGE release 5.11

#### EXPOSITORY ARTICLES

- The interpolation problem: When can you pass a curve of a given type through N random points in space? (with Ravi Vakil and Isabel Vogt). To appear in *Bull. Amer. Math. Soc.* arXiv:2405.17313
- Making accessible documents using LaTeX (with Isabel Vogt). Notices Amer. Math. Soc. Volume 70, No. 1 (2023).
- 1. Degenerations of Curves in Projective Space and the Maximal Rank Conjecture. arXiv: 1809.05980

#### INVITED CONFERENCE TALKS

- 2025 (*upcoming*) Geometry of Moduli Session at 2025 SRI in Algebraic Geometry (*upcoming*) Bootcamp for 2025 Summer Research Institute in Algebraic Geometry
- 2024 KAIST Thematic Program on Syzygies & Secants
  Moduli spaces and Arithmetic, Nagoya University Japan
  AMS Special Session: Combinatorial perspectives on algebraic curves and their moduli
- 2023 JHU/UMD Algebra and Number Theory Day Curves: Algebraic, Tropical, and Logarithmic (Banff International Research Station Canada)
- 2022 Recent Advances in Classical Algebraic Geometry, ICM satellite conference UIC Workshop on Specialization Techniques AMS special session on Moduli in Algebraic and Tropical Geometry
- 2020 (cancelled) EPIGA conference, IHP Paris
- 2019 Brill–Noether theory: geometric, tropical and singularity theory aspects, Berlin
  I-70 Algebraic Geometry Symposium
  FRG Workshop on Moduli Spaces, UIC
- 2018 Algebraic Geometry Northeastern Series (AGNES) Algebraic Geometry near-Boston Conference: Recent progress on the Maximal Rank Conjecture
- 2016 Conference in Algebra and Number Theory, Brown University

Birthday Conference for Arkady Vaintrob

2015 AIM Workshop on Degenerations in Algebraic Geometry

## INVITED SEMINAR TALKS

2025	(upcoming)	University	of	Chicago	Colloquiu	m	
	(upcoming)	University	of	Chicago	Algebraic	Geometry	Seminar

- 2024 Stony Brook Algebraic Geometry Seminar
- 2023 Brown Algebraic Geometry Seminar Humboldt University of Berlin Algebraic Geometry Seminar UC Berkeley Algebraic Geometry Seminar UC Davis Algebraic Geometry Seminar Stanford Algebraic Geometry Seminar University of Oregon Algebraic Geometry Seminar UC Berkeley Algebraic Geometry Seminar
- 2022 University of Michigan Algebraic Geometry Seminar Brown Algebraic Geometry Seminar Harvard-MIT Algebraic Geometry Seminar Brown Algebraic Geometry Seminar
- 2021 Brown Algebraic Geometry Seminar UIC Algebraic Geometry Seminar
- 2020 University of Washington Algebraic Geometry Seminar SF State Algebra-Geometry-Combinatorics Seminar
- 2019 Duke Algebraic Geometry Seminar University of Oregon Algebra Seminar University of Oregon Algebra Seminar University of Washington Colloquium
- 2018 UIC Colloquium Berkeley Algebraic Geometry Seminar UC Davis Algebraic Geometry Seminar Stanford Algebraic Geometry Seminar Harvard/MIT Algebraic Geometry Seminar
- 2017 Stony Brook Algebraic Geometry Seminar UIC Algebraic Geometry Seminar University of Chicago Algebraic Geometry Seminar Brown Algebraic Geometry Seminar
- 2016 Princeton Algebraic Geometry Seminar
- 2015 Yale Algebraic Geometry Seminar
- 2014 Harvard/MIT Algebraic Geometry Seminar
- 2010 Rutgers University Lie Group/ Quantum Math Seminar
- 2008 University of Oregon Geometric-Analysis Seminar

#### TEACHING

BROWN UNIVERSITY, Assistant Professor (tenure-track)

- Spring 2025 Math 2050: Algebraic Geometry
- Fall 2024 Math 2710U: Geometry of Moduli Spaces of Curves

Spring Fall	$2024 \\ 2023$	Math 2060: Algebraic Geometry II Math 2050: Algebraic Geometry			
Fall	2022	Math 2050: Algebraic Geometry			
Spring	2021	Math 1580: Cryptography			
Fall	2021	Math 1530: Abstract Algebra			
Spring	2021	<b>UNIVERSITY OF WASHINGTON</b> , Assistant Professor (tenure-track) Math 308: Matrix Algebra with Applications			
		STANFORD UNIVERSITY, Assistant Professor (postdoc)			
Winter	2020	Math 216B: Introduction to algebraic geometry			
Fall	2019	Math 245A: Topics in algebraic geometry (geometry of curves in projective space)			
		Advising and Mentoring at Brown University			
2025 -	_	PhD students: Xuyan Liu and Yuhan Liu			
Summer	2024	Graduate reading: Yuhan Liu on intersection theory			
		Xuyan Liu, Roberta Pagliaro, and Hao Sun, on algebraic curves Undergraduate research: An Cao and Tyler Lane			
Summer	2023	Undergraduate research: Tyler Lane			
Fall	2022	Undergraduate reading: Tyler Lane on intersection theory			
		DEPARTMENT SERVICE			
2021 -	_	Putnam Supervisor, Brown University			
		Co-supervisor for 2021–2022 and 2023–2024: Jeremy Kahn			
2021 -	_	Algebraic Geometry Seminar Organizer			
		Co-organizers: Dan Abramovich, Melody Chan, Brendan Hassett, Isabel Vogt			
	2024	Thesis Committee member for Stephen Obinna, Brown University			
2023 -	- 2024	Graduate Admissions Committee, Brown University			
	2022	Colloquium Chair, Brown University			
2021 -	- 2022	Diversity and Inclusion Committee, Brown University			
2020 -	- 2021	Putnam Committee, University of Washington			
2020 -	- 2021	Library Committee, University of Washington			
	2020	Thesis Committee member for Ben Lim, Stanford University			
	2020	Area Exam Committee member for Libby Taylor, Stanford University			
		Service to the Profession and Community			
	2024	Instructor, Math Olympiad Program			
	2023	Conference Organizer: AGNES Summer School on Intersection Theory on Moduli Spaces Co-organizers: Dan Abramovich, Melody Chan, Isabel Vogt			
	2022	Conference Organizer: AGNES Summer School on Higher Dimensional Moduli			
		Co-organizers: Dan Abramovich, Melody Chan, Brendan Hassett, Isabel Vogt			
	2021	Instructor, Math Olympiad Program			
2022 -	_	Math Reviews contributor			
2021 -	2021 – Professional Membership: American Mathematical Society				
2011 -	_	Referee for: Albanian J. Math., Arch. Math., Asian J. Math., Canad. Math. Bull., Commun.			
		Contemp. Math., Épijournal Géom. Algébr., Eur. J. Math., Glasg. Math. J., J. Pure Appl.			
		Algebra, Manuscripta Math., Proc. Amer. Math. Soc., Res. Number Theory, and Trans.			
		Amer. Math. Soc.			