

Aaron Calderon

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(he/him/his)

Research Interests

Teichmüller theory, dynamics on moduli spaces, hyperbolic geometry, geometric group theory, low-dimensional topology, monodromy problems in algebraic geometry

Academic Positions

University of California, Berkeley

Assistant Professor

Starting Fall 2026

The University of Chicago

L.E. Dickson Instructor

2022–26

NSF Postdoctoral Fellow

2022–25

Education

Yale University

PH.D. in Mathematics, advised by Yair Minsky

2022

M.S., M. PHIL. in Mathematics

2019

Lang Fellowship

The University of Nebraska–Lincoln

B.S. in Mathematics, minor in Philosophy, University Honors Program

2016

Highest Distinction, Phi Beta Kappa, Chair's Prize for Mathematics

Goldwater Scholar (2015)

Other Educational Experiences

The Independent University of Moscow

Math in Moscow

Spr. 2015

AMS Math in Moscow Scholarship, Diploma with Distinction

The Pennsylvania State University

Mathematics Advanced Study Semesters (MASS)

Fall 2013

MASS Fellowship, Diploma with Distinction

Grants & Funded Collaborations

NSF DMS-2506934, *Dynamics on moduli spaces of hyperbolic surfaces*

2025–28

NSF DMS-2202703, Mathematical Sciences Postdoctoral Research Fellowship

2022–25

AIM SQuaRE, *How do simple closed geodesics cut up a hyperbolic surface?*

Since 2024

(with F. Arana-Herrera, J. Athreya, and J. Sapir)

Chicago FACCTS program, *Surfaces, ribbon graphs, and counting problems*

2024–25

(with A. Zorich)

NSF Graduate Research Fellowship

2016–21

Publications & Preprints

- Deflating hyperbolic surfaces and the shapes of optimal Lipschitz maps
(with J. Tao)
Submitted (2025). arXiv:2510.19930.
- Siegel–Veech constants for cyclic covers of generic translation surfaces
(with D. Auricino, C. Matheus, N. Salter, and M. Schmoll)
J. Lond. Math. Soc. **113** (1): e70413 (2026). arXiv:2409.06600.
- Hierarchical hyperbolicity of admissible curve graphs
(with J. Russell)
Submitted (2024). arXiv:2409.06798.
- On Mirzakhani’s twist torus conjecture
(with J. Farre)
Duke Math J. (accepted 2025). arXiv:2405.12106.
- Realizing pairs of multicurves as cylinders on translation surfaces
(with J. Aygun, J. Barkdoll, J. Lorman, and T. Sandstrom)
Alg. Geom. Top. **25**: 5031–5057 (2025). arXiv:2404.08096.
- Continuity of the orthogeodesic foliation and ergodic theory of the earthquake flow
(with J. Farre)
Forum of Math., Sigma **13**: e151 (2025). arXiv:2401.12299.
- The distribution of critical graphs of Jenkins–Strebel differentials
(with F. Arana-Herrera)
Geom. Topol. **29** (5): 2571–2608 (2025). arXiv:2305.01717.
- The shapes of complementary subsurfaces to simple closed hyperbolic multi-geodesics
(with F. Arana-Herrera)
Invent. Math. **242**: 571–626 (2025). arXiv:2208.04339.
- Shear-shape cocycles for measured laminations and ergodic theory of the earthquake flow
(with J. Farre)
Geom. Topol. **28** (5): 1995–2124 (2024). arXiv:2102.13124.
- Framed mapping class groups and the monodromy of strata of Abelian differentials
(with N. Salter)
J. Eur. Math. Soc. **25** (12): 4719–4790 (2023). arXiv:2002.02472.
- Relative homological representations of framed mapping class groups
(with N. Salter)
B. Lond. Math. Soc. **53** (1): 204–219 (2021). arXiv:2002.02471.
- Higher spin mapping class groups and strata of Abelian differentials over Teichmüller space
(with N. Salter)
Adv. Math. **389**: Paper no. 107926 (2021). arXiv:1906.03515.
- Connected components of strata of Abelian differentials over Teichmüller space
Comment. Math. Helv. **95** (2): 361–420 (2020). arXiv:1901.05482.
- How to hear the shape of a billiard table
(with S. Coles, D. Davis, J. Lanier, and A. Oliveira)
Submitted (2018). arXiv:1806.09644.
- Generalized bipyramids and hyperbolic volumes of alternating k -uniform tiling links
(with C. Adams and N. Mayer)
Topology Appl. **271**:1–28 (2020). arxiv:1709.00432.

Volume and determinant densities of hyperbolic rational links
(with C. Adams, X. Jiang, A. Kastner, G. Kehne, N. Mayer, and M. Smith)
J. Knot Theory Ramifications **26** (2017), No. 1 1750002. arXiv:1510.06050

Teaching Experience

THE UNIVERSITY OF CHICAGO

Instructor, Math 16300 Honors Calculus III (2 sections)	Spr. 2026
Instructor, Math 16200 Honors Calculus II (2 sections)	Wint. 2026
Instructor, Math 27600 Introduction to Dynamical Systems	Wint. 2025
Instructor, Math 27000 Basic Complex Variables	Fall 2024
Instructor, Math 27000 Basic Complex Variables	Spr. 2024
Instructor, Math 20410 Accelerated Analysis II	Win. 2024

YALE UNIVERSITY

Instructor, Math 111 Introduction to Functions and Calculus II	Spr. 2022
Instructor, Math 120 Vector Calculus	Fall 2020
Teaching assistant, Math 120 Vector Calculus	Sum. 2020
Instructor, Math 115 Integral Calculus	Spr. 2020
Instructor, Math 120 Vector Calculus	Fall 2018
Coach (group tutor), Math 120 Vector Calculus	Fall 2016

THE UNIVERSITY OF NEBRASKA–LINCOLN

Teaching assistant, Math 106 Differential Calculus	Spr. 2016
Teaching assistant, Math 106 Differential Calculus	Fall 2015
Teaching assistant, Math 208 Vector Calculus	Fall 2014

Mentoring Experience

UCHICAGO REU

Guided undergraduates through reading literature, gave feedback on writing survey reports

Co-advisor, The topology of 4-manifolds	Sum. 2024
Advisor, Patterson-Sullivan measures	Sum. 2023

SUMRY (YALE REU)

Developed projects, oversaw original research, gave feedback on writing and presentations

Advisor, “Cylinder configurations on flat surfaces”	Sum. 2021
Co-advisor (with I. Adelstein), “Oblivious points on flat surfaces”	Sum. 2019
Co-advisor (with I. Adelstein), “Minimizing geodesics on doubled polygons”	Sum. 2018

DIRECTED READING PROGRAM

Led reading groups, suggested exercises, assigned projects and presentations

External:

Mapping class groups and Teichmüller theory for nonorientable surfaces	2024–25
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UChicago:

DeRham cohomology and differential forms	Wint. 2026
Calculus of variations	Spr. 2025
Projective geometry	Wint. 2025
Entropy in dynamics	Spr. 2024
Random walks on reductive groups	Wint. & Spr. 2023
Algebraic topology with differential forms	Fall 2022

Yale:

Rational points on elliptic curves	Fall 2021
Lie groups and homogeneous spaces	Spr. 2021
Braid groups	Spr. 2020
Riemann surfaces and dessins d'enfants	Spr. 2019
An introduction to geometric group theory	Fall 2018

Selected Presentations

INVITED CONFERENCE AND WORKSHOP TALKS

Topological and Geometric Structures in Low Dimensions, SLMATH	Mar. 2026
Dynamics and Rigidity (Eskinfest), Cetraro, Italy	July 2025
Groups, Geometry, and Dynamics workshop, Purdue	Mar. 2025
BIRS Workshop: Perspectives on Markov Numbers (virtual)	Jan. 2025
Moving to Higher Rank (Canaryfest), Cetraro, Italy	July 2024
AMS Special Session on Developments in Hyperbolic-like Geometry and Dynamics University of Wisconsin Milwaukee	Apr. 2024
Bloomington Geometry workshop	Apr. 2024
International Iberoamerican Congress on Geometry, Pucón, Chile	Dec. 2023
Texas Geometry and Topology Conference, Rice	Nov. 2023
Midwest Dynamical Systems Conference, UIC	Oct. 2023
Graduate Student Topology and Geometry Conference, Harvard (virtual)	July 2023
Cornell Topology Festival	May 2022
Counting Problems, Ventotene, Italy	Sep. 2021
AMS Special Session on the Geometry of Groups and 3-Manifolds, Penn State (virtual)	Oct. 2020
Nearly Carbon Neutral Geometric Topology Conference (virtual)	June 2020
Flat Surfaces and Dynamics on Moduli Space, II, Oaxaca, Mexico.	May 2019
AMS Graduate Student Conference in Geometry and Topology, Brown.	Apr. 2019
AMS Special Session on Mapping Class Groups, Auburn.	Mar. 2019

INVITED SEMINAR TALKS

Northwestern Dynamics seminar	May 2026
University of Illinois Chicago Geometry, Topology, and Dynamics seminar	Sep. 2025
Glasgow Geometry and Topology seminar	Aug. 2025
Jussieu Complex Analysis and Geometry seminar	Apr. 2025
Bordeaux Geometry seminar	Apr. 2025
Penn State Dynamics seminar	Mar. 2025
UChicago joint Geometry and Topology/No Boundaries seminar	Dec. 2024
Berkeley Topology seminar	Mar. 2024
Wisconsin Dynamics seminar	Mar. 2024
UChicago Dynamics seminar	Jan. 2024

Georgia Tech Geometry Topology seminar	Dec. 2023
Boston College Geometry/Topology/Dynamics seminar	Nov. 2023
Maryland Dynamics seminar	Oct. 2023
Joint seminar on Teichmüller Theory and Related Topics, Tsinghua/Nankai/Peking (virtual)	Apr. 2023
Vanderbilt Topology and Group Theory seminar	Mar. 2023
Indiana Geometry seminar	Feb. 2023
Rice Topology seminar	Nov. 2022
Indian Institute of Science Geometry and Topology seminar (virtual)	Nov. 2022
UChicago Dynamics seminar	Oct. 2022
UChicago No Boundaries seminar	Oct. 2022
Heidelberg Geometry group meeting	July 2022
Glasgow Geometry and Topology seminar (virtual)	Mar. 2022
UT Austin Groups, Geometry, and Dynamics seminar (virtual)	Feb. 2022
Brown Geometry and Topology seminar	Dec. 2021
UC San Diego Group Actions seminar (virtual)	Nov. 2021
Pacific Dynamics seminar (virtual)	May 2021
Ohio State Geometry and Topology seminar (virtual)	Mar. 2021
Indiana Geometry seminar (virtual)	Oct. 2020
Yale Geometry and Topology seminar (virtual)	Oct. 2020
Billiards and Surfaces a la Teichmüller and Riemann Online seminar (virtual)	May 2020
USC Teichmüller theory and quantum topology seminar	Nov. 2019
Michigan Topology and RTG seminars	Oct. 2019
Columbia Geometric Topology seminar	Feb. 2019
Tufts Geometric Group Theory and Topology seminar	Feb. 2017
Univ. of Nebraska–Lincoln Groups, Semigroups and Topology seminar	Oct. 2015
Univ. of Nebraska–Lincoln Groups, Semigroups and Topology seminar	Dec. 2014

Undergraduate Research Experience

Undergraduate Research , The University of Nebraska–Lincoln Nebraska UCARE grant Research in geometric group theory under the direction of Susan Hermiller	2014–16
SMALL REU , Williams College Research in hyperbolic knot theory under the direction of Colin Adams	2015
Penn State REU , Penn State University Research on lattice tilings under the direction of Viorel Nitica	2013

Service & Outreach

Referee or quick opinion for AGT, Advances, Annals, Annales Fennici, BLMS, Duke, Dynamical Systems, ETDS, GAFA, G&T, IMRN, JDG, J. Top, PAMS, Topology and its Applications	
Organizer, Dynamics and Ergodic Theory Active and Informal Learning Seminar	Since 2023
Co-organizer, Chicago Geometry and Topology seminar	2022–24
External reviewer for Riccardo Giannini’s Ph.D. viva (Glasgow)	Aug. 2025
Faculty speaker, UChicago high school enrichment programs	Sum. 2023–25
Mentor, Topology Students Workshop	June 2024

Co-organizer, Midwest Dynamical Systems Early Career Conference (at Ohio State)	May 2024
Organizer, Session on Teichmüller space and geodesic currents, Nearly Carbon Neutral Geometry and Topology Conference	Sep. 2022
Co-founder and chair of Yale math dept. graduate student advisory committee	2020–22
Co-organizer of Yale math dept. prospective grad student visit day	Spr. 2021
Grad student rep. for the Yale math dept.’s committee on diversity, equity, and inclusion	Fall 2020
Organizer of “Flat Surfers” online reading group	Sum. and Fall 2020
Invited graduate student panelist, CeSMUR Conference, Univ. of Nebraska–Lincoln	Apr. 2018
Co-organizer of Yale Graduate Student seminar	Fall 2017
Actor in Mathematically Bent Theater, AMS-MAA Joint Meetings.	Jan. 2016
Univ. of Nebraska–Lincoln Academic Program Review student representative	2015
Pi Mu Epsilon National Mathematics Honorary Society	2012–16