

# Aaron Calderon

---

The University of Chicago  
Department of Mathematics  
Eckhart Hall, 5734 S. University Ave  
Chicago IL, 60637

*Email:* aaroncalderon@uchicago.edu  
*Website:* aacalderon.com  
*Mobile:* (402) 350-4827  
(he/him/his)

## Research Interests

Teichmüller theory, flat surfaces, mapping class groups, hyperbolic geometry, geometric group theory, dynamics on moduli spaces

## Academic Positions

**L.E. Dickson Instructor** The University of Chicago, Chicago, IL 2022–  
**NSF Postdoctoral Fellow** The University of Chicago, Chicago, IL 2022–25

## Education

**Yale University** New Haven, CT 2016–22  
Ph.D. in Mathematics, advised by Yair Minsky  
M.S., M. PHIL. in Mathematics  
Lang Fellowship

**The University of Nebraska–Lincoln** Lincoln, NE 2012–16  
B.S. in Mathematics, minor in Philosophy, University Honors Program  
Highest Distinction, Phi Beta Kappa, Chair's Prize for Mathematics

## Other Educational Experiences

**The Independent University of Moscow** Moscow, Russia Spr. 2015  
Math in Moscow  
AMS Math in Moscow Scholarship, Diploma with Distinction

**The Pennsylvania State University** University Park, PA Fall 2013  
Mathematics Advanced Study Semesters  
MASS Fellowship, Diploma with Distinction

## Honors & Awards

NSF Mathematical Sciences Postdoctoral Research Fellowship 2022–25  
NSF Graduate Research Fellowship 2016–21  
Barry Goldwater Scholar 2015  
Dean H. and Floreen G. Eastman Scholarship 2012–16

## Publications & Preprints

Shear-shape cocycles for measured laminations and ergodic theory of the earthquake flow  
(with J. Farre)  
*Submitted* (2021). arXiv:2102.13124.

- Framed mapping class groups and the monodromy of strata of Abelian differentials  
(with N. Salter)  
*J. Eur. Math. Soc.* (accepted) (2021). 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

### 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

### SUMRY (YALE REU)

*Developed projects, oversaw 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 (YALE)

*Led undergraduate reading groups, suggested problems, assigned individual projects and presentations*

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 TALKS

Cornell Topology Festival	May 2022
Glasgow Geometry and Topology Seminar (virtual)	March 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
Counting Problems, Ventotene, Italy	Sep. 2021
Pacific Dynamics seminar (virtual)	May 2021
Ohio State Geometry and Topology seminar (virtual)	March 2021
Indiana Geometry seminar (virtual)	Oct. 2020
Yale Geometry and Topology seminar (virtual)	Oct. 2020
AMS Special Session on the Geometry of Groups and 3-Manifolds, Penn State (virtual). 2020	Oct.
Nearly Carbon Neutral Geometric Topology Conference (virtual)	June 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
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
Columbia Geometric Topology seminar	Feb. 2019
Tufts Geometric Group Theory and Topology seminar	Feb. 2017

### CONTRIBUTED TALKS

Graduate Student Topology & Geometry Conference, UIUC	Mar. 2019
Topology Students Workshop, Georgia Tech	June 2016
AMS Special Session in Topological and Smooth Dynamics, North Dakota State	Apr. 2016
Undergraduate thesis defense, University of Nebraska–Lincoln	Mar. 2016
AMS–MAA Joint Meetings Poster Session, Seattle (with N. Mayer) Outstanding Student Presenter	Jan. 2016

Univ. of Nebraska–Lincoln Groups, Semigroups and Topology Seminar Oct. 2015  
 Univ. of Nebraska–Lincoln Groups, Semigroups and Topology Seminar Dec. 2014

### Workshops & Programs Attended

Mapping class groups and  $\text{Out}(F_n)$  Apr. 25–29  
 IHP, Paris.

Advancing Bridges in Complex Dynamics Sep. 2021  
 CIRM, Luminy, Marseille.

Creating a better summer experience: a DEI workshop for REU faculty mentors May 2021  
 Zoom — hosted by the Center for Minorities in the Mathematical Sciences

Holomorphic differentials in mathematics and physics Aug., Nov. 2019  
 MSRI, Berkeley.

Combinatorial and algebraic aspects of geometric structures July 2019  
 Chiang Mai University, Thailand. 3

Flat surfaces and dynamics on moduli space, II May 2019  
 Casa Matemática Oaxaca, Mexico.

Workshop on dynamics and moduli spaces of translation surfaces Oct. 2018  
 Fields Institute, Toronto.

Teichmüller dynamics, mapping class groups and applications June 2018  
 Summer school and conference at the Institut Fourier, Grenoble.

Geometry and topology of 3-manifolds workshop May 2018  
 Okinawa Institute of Science and Technology.

Introduction to geometry, dynamics, and moduli in low dimensions Sep. 2017  
 LMS–CMI Research School at the University of Warwick.

Polygonal Billiards Research Cluster, Tufts University July, Aug. 2017

Workshop in Geometric Topology, Provo, UT June 2017

Topology Students Workshop, Georgia Tech. June 2016

### Undergraduate Research Experience

**Undergraduate Research**, The University of Nebraska–Lincoln 2014–16  
 NSF grant [DMS–1313559], Nebraska UCARE grant  
 Research in geometric group theory under the direction of Susan Hermiller

**SMALL REU**, Williams College 2015  
 Research in hyperbolic knot theory under the direction of Colin Adams

**Penn State REU**, Penn State University 2013  
 Research on lattice tilings under the direction of Viorel Nitica

### Service & Outreach

Referee or quick opinion for *Algebr. Geom. Topol.*, *Ann. of Math.*, *Erg. Th. Dyn. Sys.*, *Geom. Topol.*, *Int. Math. Res. Not.*, *Dyn. Syst.*

Reviewer for *Mathematical Reviews*

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