

Yash Lodha

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Citizenship: US Permanent resident (Green Card holder), Indian citizen.

EDUCATION AND WORK EXPERIENCE

Associate professor, August 18 2025-
Purdue University

Associate professor, July 2025-August 17 2025
University of Hawai'i at Mānoa

Assistant professor, August 2022-July 2025
University of Hawai'i at Mānoa

Principle investigator, START project of the Austrian science fund August 2021- July 2022
University of Vienna

Center for mathematical challenges research fellow January 2021- June 2021.
Korea institute for advanced study, Seoul.

Principal investigator, Swiss NSF grant "Ambizione" EPFL, Lausanne September 2017-January 2021

EPFL postdoc (EPFL-Marie Curie fellowship) EPFL, Lausanne April 2015- August 2017

PhD Cornell University, Mathematics 2015

RESEARCH INTERESTS

- Combinatorial, Topological and Geometric Group theory.

AWARDS AND HONORS

- **The US National science foundation's CAREER award.** Project funds: 552,986 USD for the period 2023 – 2028. Described on the National Science Foundation's website as their "most prestigious award in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization."
- **START prize of the Austrian science foundation.** The Austrian version of the ERC starting grant, with funds up to 1.2 million Euros to set up a research team at the University of Vienna. Awarded after a competitive two stage selection process, it is regarded as the highest Austrian prize given to young scientists.
- **The Swiss national science foundation grant Ambizione,** with project funds worth 312,627 Swiss francs for the period 2017 – 2020. Awarded after a competitive two stage selection process.
See: <http://www.snf.ch/en/funding/careers/ambizione/Pages/default.aspx>
- **EPFL-Marie Curie fellowship for the period 2015-2017.** A fellowship award that funds a postdoctoral appointment at EPFL, Lausanne co-funded by Marie Curie. Awarded after a competitive two stage selection process.
See: <http://research-office.epfl.ch/funding/internal-non-profit/epfl-fellows-marie-curie/granted-fellowships-2014/yash-lodha>
- **Winner of the 2014 Mary Ellen Rudin young researcher award in Topology** This is an annual (USD 15,000) award recognizing one young researcher every year in any of the areas central to topology.
See: <http://www.journals.elsevier.com/topology-and-its-applications/news/2014-winner-of-the-mary-ellen-rudin-young-researcher-award/>

- **Hutchinson fellowship 2014** Awarded by Cornell University's Mathematics Department to students who have been outstanding in their work in the Ph.D. program.
- **Lawrence I. Wilkins Scholarship (2007-2009)** Awarded to the best undergraduate student in Mathematics at Binghamton University.

Full list of publications

- (1) *A nonamenable finitely presented group of piecewise projective homeomorphisms*, with Justin Moore.
Groups, Geometry and Dynamics. Volume 10, Issue 1, 2016 pp 177-200
- (2) *An upper bound for the Tarski numbers of non amenable groups of piecewise projective homeomorphisms*
International Journal of Algebra and Computation Vol. 27, No. 3 (2017) 315-321.
- (3) *A hyperbolic group with a finitely presented subgroup that is not of type FP_3*
Proceedings of the Durham symposium on geometric and cohomological group theory. Cambridge University Press October 2017 ISBN: 9781316771327
- (4) *Commutators in groups of piecewise projective homeomorphisms* with Pep Burillo and Lawrence Reeves.
Advances in Mathematics. Volume 332, 9 July 2018, Pages 34-56
- (5) *Chain groups of homeomorphisms of the interval and the circle* with Sang-Hyun Kim and Thomas Koberda.
Annales scientifiques de l'École normale supérieure. Tome 52, Fasc. 4, pp 797-820 2019.
- (6) *Hyperbolicity as an obstruction to smoothability for one-dimensional actions* with Christian Bonatti and Michele Triestino.
Geometry and Topology. 23 (2019) 1841-1876. DOI: 10.2140/gt.2019.23.1841
- (7) *2-chains and square roots of Thompson's group F .* with Thomas Koberda.
Ergodic Theory and Dynamical Systems, . 1-18. doi:10.1017/etds.2019.14
- (8) *Coherent group actions on the real line or an interval*
Israel Journal of Math. (2019). <https://doi.org/10.1007/s11856-019-1954-7>
- (9) *Finitely generated infinite simple groups of homeomorphisms of the real line* with James Hyde.
Inventiones mathematicae October 2019, Volume 218, Issue 1, pp 83-112.
- (10) *A finitely presented infinite simple group of homeomorphisms of the circle.*
Journal of the London Mathematical Society
Volume 100, Issue 3 December 2019 Pages 1034-1064
- (11) *Uniformly perfect finitely generated simple left orderable groups* with Hyde, Navas and Rivas.
Ergodic Theory and Dynamical Systems DOI: <https://doi.org/10.1017/etds.2019.59>
- (12) *Property FW, differentiable structures, and smoothability of singular actions* with Matte Bon and Triestino
The Journal of Topology. 13 (2020) 1119-1138
- (13) *Approximating nonabelian free groups by groups of homeomorphisms of the real line.*
Journal of Algebra. Volume 563, 1 December 2020, Pages 292-302.
<https://doi.org/10.1016/j.jalgebra.2020.07.018>
- (14) *A nonamenable type F_∞ group of piecewise projective homeomorphisms*
The Journal of Topology
Volume 13, Issue 4 Pages 1767-1838 December 2020. DOI:10.1112/topo.12172
- (15) *The BNSR-invariants of the Lodha-Moore groups, and an exotic simple group of type F_∞* with Matthew C.B. Zaremsky.
Mathematical Proceedings of the Cambridge Philosophical Society, 1-24.

doi:10.1017/S0305004122000111

- (16) *Generic algebraic properties in spaces of enumerated groups.*
with Goldbring and Kunawalkam Elayavalli.
Transactions of the AMS.
Volume 376, Number 9, September 2023, Pages 6245–6282
<https://doi.org/10.1090/tran/8902>
- (17) *Second bounded cohomology of groups acting on 1-manifolds and applications to spectrum problems.*
with Fournier-Facio.
Advances in Mathematics,
Volume 428, 2023, 109162, ISSN 0001-8708.
- (18) *Finitely presented left orderable monsters.*
with Francesco Fournier-Facio and Matthew C. B. Zaremsky.
Ergodic Theory and Dynamical Systems.
1-12. doi:10.1017/etds.2023.49
- (19) *Two new families of finitely generated simple groups of homeomorphisms of the real line.*
with James Hyde and Cristóbal Rivas.
The Journal of Algebra
Volume 635, 1 December 2023, Pages 1-22
- (20) *Braided Thompson groups with and without quasimorphisms.*
with Fournier-Facio and Zaremsky.
Algebraic and Geometric Topology.
24 (2024) 1601–1622 DOI: 10.2140/agt.2024.24.1601
- (21) *Some combinatorial group theoretic enigmas.*
The Internationale Mathematische Nachrichten of the Austrian math society.
Nr. 249 (76. Jahrgang) April 2022 (Submitted upon invitation).
- (22) *Finitely presented simple left-orderable groups in the landscape of Richard Thompson's groups.*
with James Hyde.
Annales scientifiques de l'École normale supérieure.
4e série, t. 58, 2025, p. 419 à 432
- (23) *An algebraic criterion for the vanishing of bounded cohomology.*
with Campagnolo, Fournier-Facio, and Moraschini.
to appear in Compositio Mathematica.
arXiv:2311.16259
- (24) *Displacement techniques in bounded cohomology.*
with Campagnolo, Fournier-Facio, and Moraschini.
Manuscripta Math.
176 (2025), no. 2, Paper No. 19, 26 pp.

Preprints

- (1) *On Ulam widths of finitely presented infinite simple groups.*
with James Hyde.
arXiv:2410.07512
- (2) *Generic torsion-free groups and Rubin actions.*
with Thomas Koberda.
arXiv:2503.11772
- (3) *Just infinite quotients of finitely generated subgroups of $PL^+[0, 1]$.*
arXiv:2503.13523
- (4) *On some algebraic and analytic properties of the finitely generated simple left orderable groups G_ρ .*
with Pawel Aleksander Fedorynski.
arXiv:2509.09856
- (5) *Embeddings into highly transitive and mixed identity free groups.*

with James Hyde.
arXiv:2509.09788

- (6) *The Wiegold problem and free products of left-orderable groups.*
with Lvzhou Chen.
arXiv:2510.26073

INVITED CONFERENCE TALKS

- *Invited lecture at the JMM special session in Geometric group theory.* January 2026, Washington D.C.
- *Dynamical Group Theory - new methods in group actions on manifolds* Korea institute for advanced study, August 2024. (Declined due to travel constraints from the green card application process).
- *Group Actions and Rigidity around the Zimmer Program: Workshop on Low Dimensional Actions* Institut Henri Poincaré, Paris. April 29-May 04 2024. (Declined due to travel constraints from the green card application process).
- *Workshop on orderings and groups at Instituto de Ciencias Matemáticas (ICMAT),* Madrid, June 2023.
- *4th Korea-France Conference in Mathematics* Seoul, August 2023. (Declined due to personal reasons).
- *Modern Group Theory and related subjects: An ICM 2022 satellite conference.* New York, July 2022.
- *Self-similarity of groups, trees and fractals,* IHP Paris, June 2022.
- *Young geometric group theory.* Newcastle, UK, July 2021.
- *Topics at the Interface of Low Dimensional Group Actions and Geometric Structures .* IMS, Singapore on 4-15 Jan 2021.
- *Rigidity and Regularity of Diffeomorphism Groups.* KIAS (Seoul, Korea) for August 3 - 7, 2020.
- *Ordered Groups and Rigidity in Dynamics and Topology,* Banff International Research Station, Oaxaca, Mexico. June 16 to June 21, 2019
- *8th topology conference in Dubrovnik,* June 24-28 2019
- *Groups, Geometry and Dynamics, a satellite meeting for the ICM 2018* 23rd-27th July, 2018.
- *Geometric and Asymptotic Group Theory with Applications* July 16 -20, 2018 Seoul, Korea.
- *Workshop on Cohomological and Metric Properties of Groups of Homeomorphisms of $\mathbb{R}$* Oberwolfach 3 June to 9 June 2018.
- *Fifteenth Annual Spring Institute on Noncommutative Geometry and Operator Algebras.* May 5 to May 11, 2017, at Vanderbilt University in Nashville, Tennessee.
- *Ergodic and Geometric Group theory in Sendai* October 23-25, 2017.
- *Groups and Geometry in the South East* UCL, London. October 28th 2016.
- *Geometric and Cohomological Group theory symposium.*
August 2013, Durham University.
- *Groups, graphs and action*
October 2015; Organized by University of Neuchatel.
- *"Geometries in Action", a conference in honor of Etienne Ghys, held at the Ecole normale superieure in Lyon, from June 29 to July 3, 2015*
- *Spring topology and dynamics conference.* (Mary Ellen Rudin award winner's lecture) May 14-16, 2015
- *Groups and geometry in the gulf coast.* March 2015.
- *Barcelona weekend in group theory.*
May 2015.
- *Workshop on Thompson's groups.*
- *Topological methods in group theory, a conference in honor of Ross Geoghegan.* June 2014; Ohio state University.
May 2014; University of St. Andrews, Scotland.
- *International conference on Orderable groups.*
September 2014; Organized by Universidad de Santiago de Chile.

INVITED COLLOQUIUM, SEMINAR AND WORKSHOP TALKS

- *Mathematics departmental colloquium (Oliver club)* September 2025, Cornell University.
- *Algebra/Topology seminar* September 2025, State University of New York at Albany.
- *A mini course on "Orderability and groups of dynamical origin"*. March 2025, The University of Geneva.
- *EKG Seminar*. March 2025, EPFL Lausanne.
- *Geometry Seminar*. March 2025, ETH Zurich.
- *Groupes et géométrie seminar*. March 2025, The University of Geneva.
- *Departmental colloquium*. January 2025, National University of Singapore.
- *Departmental colloquium*. December 2024, Purdue.
- *Departmental colloquium*. December 2024, University of South Florida.
- *Departmental colloquium*. May 23, 2024, University of California at Santa Cruz.
- *Groups and Operator Algebras Seminar*. February 14, 2024. University of Copenhagen.
- *Workshop on Groups of Thompson and their relatives* 18-22 September 2023, Otto-von-Guericke-Universität Magdeburg .
- *Seminar at the University of Regensburg*. June 2022.
- *Logic Colloquium at the University of Vienna* January 2022.
- *Mathematics Colloquium at the Karlsruhe institute of technology* January 2022
- *Mathematics Colloquium at the University of Vienna* January 2022.
- *Virtual topology and group theory seminar at Cornell University* December 2021.
- *Virtual seminar in Bielefeld* July 2021.
- *Virtual seminar in Milan* February 2021.
- *Virtual seminar at the Ohio state university* February 2021.
- *Two online mini courses in geometric group theory* KAIST, Korea. December 2020, January 2021.
- *Pure Mathematics Colloquium* University of St. Andrews, October 1, 2020.
- *Geometry and Analysis on groups research seminar* University of Vienna, October 13 2020.
- *Topics in special functions and number theory seminar* JNU, Delhi. January 28 2020.
- *Harmonic analysis, operator algebras and representation theory seminar* Stockholm university. November 2019.
- *Topology seminar* Binghamton University. October 2019.
- *Seminar* SUNY, Albany. October 2019.
- *Pure Mathematics Colloquium* Ashoka University, Delhi. August 2019.
- *Pure Mathematics Colloquium* University of Southampton. May 2019.
- *Department Colloquium* University of Hawai'i at Manoa. April 2019.
- *Group theory seminar* Royal Holloway, University of London. March 2019.
- *Geometry and Topology seminar* Binghamton University. March 2019.
- *Topology seminar* Cornell University. March 2019.
- *Department colloquium* University of Virginia. February 2019.
- *Group theory seminar* ICMAT, Madrid. February 2019
- *Seminario de grupos* USACH Santiago, Chile October 2018
- *Séminaire Gaston Darboux*, Montpellier September 2018
- *Ergodic theory Seminar*, Rennes May 2018.
- *Department Colloquium*, University of Neuchâtel. Spring 2018.
- *Seminar in Topology and Group theory*, Vanderbilt University January 2018.
- *Seminar in Topology*, University of Tokyo. October 2017.
- *Seminar*, ETH Zurich. October 2017.
- *Seminar*, University of Neuchatel. September 2017.
- *Seminar*, University of Fribourg. April 2017.
- *Seminar*, Institut de mathématiques de Bourgogne, November 2016.
- *Algebra and Topology Seminar talks*, University of Virginia, September 2016.
- *Colloquium*, Tata institute of fundamental research, Mumbai, India.
- *Seminar*, University of Montpellier. April 2015.

- *Seminar*, University of Geneva. April 2015.
- *Seminar*, University of Vienna. July 2015.
- *Seminar*, Moscow state University. August 2015.
- *Seminar*, ETH Zurich. October 2015.
- *Seminar*, Bielefeld. December 2015.
- *Advanced algebra class*, Three lectures on amenable equivalence relations and groups of piecewise projective homeomorphisms. Oxford University, May 2014.
- *Oberwolfach workshop on superrigidity*, Character rigidity for Thompson's groups. April 2014.
- *Group theory seminar*, December 2013; Vanderbilt University.
- *Chicago Operator Algebra and Group Theory Seminar*, October 2014; Northwestern University.
- *New York Group theory seminar*, November 2014; CUNY Graduate center.
- *Groups and dynamics seminar*, November 2014; Texas A and M.
- *Joint Geometry, Groups and Dynamics/GEAR and Logic Seminar*, December 2014; University of Illinois at Urbana Champaign.
- *Geometry, Topology and Dynamics Seminar*, December 2014; University of Illinois at Chicago.
- *Seminario "Compartamos lo que sabemos de grupos"*, August 2014; USACH, Chile.
- *Seminar*, IMSC Chennai. February 2015.
- *Seminar*, IISER Trivandrum. March 2015.
- *Advanced algebra class*, Three lectures on non amenable groups of piecewise projective homeomorphisms. RKMVU, Kolkata, January and February 2015.
- *Topology and group theory seminar*, October 2013; Binghamton University .
- *Spring topology and dynamics conference*, March 2014; University of Richmond.
- *Topology and geometric group theory seminar*, November 2012 and September 2013; Cornell University.

THESIS SUPERVISION

- Masters thesis of Sydney Fields at the University of Hawaii at Manoa titled "Actions of groups on $\mathbb{R}$ ". (May 2024).
- Masters thesis of Arnaud Studer at the EPFL titled "Bestvina-Brady Morse theory and finiteness properties of groups". (July 2018).
- Masters thesis of Nicolas Vaskou at the EPFL titled "Some topics in the theory of Hyperbolic groups". (January 2019).

TEACHING EXPERIENCE

- Instructor for Math 244, 243 (multivariable calculus), Math 370 (Mathematical finance), Math 623 (Geometric group theory), Math 321 (Topology) at the University of Hawai'i at Mānoa.
- Instructor for the course "Smooth manifolds" for advanced undergraduates at the EPFL in Fall 2020. Worked with a Ph.D. assistant in a hybrid format, combining blackboard instruction in a classroom setting with a video camera delivering live footage to students attending from home.
- Instructor for the course "Geometry for mechanical engineers" with an enrolment of 206 students at the EPFL in Spring 2018. Supervised a Ph.D. student teaching assistant and a team of seven masters student assistants for the exercise sessions.
- Taught two graduate "half semester" courses at the EPFL on "Finiteness properties of groups" and "Golod Shafarevich groups".
- Teaching assistant at Cornell University for various courses including Calculus, Multivariable calculus, Linear Algebra, Introduction to Logic, Geometry, and Calculus for engineers.

REFEREED PAPERS FOR

- Duke math journal, Compositio Math, Journal of Topology, Quarterly journal of mathematics, Journal of Combinatorial algebra, Annales Henri Lebesgue, The Journal (and the Bulletin) of the London mathematical society, Discrete analysis, Journal of functional analysis, Transactions of the AMS, Geometrae Dedicata, Fundamenta Mathematicae, Math. Annalen, Geometry and topology, Groups Geometry and Dynamics, Math. Proc. Camb. Phil. Society.

RESEARCH COMMUNITY SERVICE

- Served on the National science foundation's CAREER award panel (Topology section) in 2024 at the NSF headquarters in Alexandria, Virginia .

UNIVERSITY COMMITTEE AND OUTREACH WORK

- Started an undergrad math club in the year 2023. I built a student team to lead the club and advertised the club extensively within the university. Organised over a dozen events, some notable ones include mathematical lectures by pure and applied mathematicians, a series of "Math in industry" talks by a former chief data scientist at Vitol, a Mathematician and lead data scientist at Target, and a software engineer at Google. The club organized various game nights, problem solving sessions, and informational sessions for opportunities in math at UH such as undergraduate research.
- Served on the tenure track hiring committee (2022-2023), the postdoc hiring committee (2023-2024), the curriculum committee (2022-2024), and the colloquium committee (2022-2024).

CONFERENCE ORGANISATION

- Organized and led a two week long workshop at University of Hawai'i at Mānoa in July 2024 to train graduate students interested in pursuing a research program in geometric group theory. The workshop was called "Topological and Analytic methods in group theory" and featured 25 participants, four mini courses by international researchers and five additional research talks.
- Co-organized the 16th installment of the annual conference on Geometric and Asymptotic Group Theory with Applications (GAGTA) that took place at the Erwin Schrödinger International Institute for Mathematics and Physics (ESI), Vienna, Austria, July 17-21, 2023.
- Co-organized a session "Group Actions on Manifolds and Related Spaces" at the AMS Fall Eastern Sectional Meeting at Binghamton University in October 2019.
- Co-organized a "Geometric group theory" session at the summer topology conference at the university of Vienna in July 2022.

REFERENCES

Justin Moore, Professor of Mathematics, Cornell University.
 Andres Navas, Professor of Mathematics, USACH, Chile.
 Rostislav Grigorchuk, Professor of Mathematics, Texas A&M.
 Danny Calegari, Professor of Mathematics, The University of Chicago
 Martin Bridson, Professor of Mathematics, Oxford University
 Matt Brin. Professor of Mathematics, Binghamton University.
 Ian Leary, Professor of Mathematics, University of Southampton.
 Thomas Koberda, Professor of Mathematics, University of Virginia.
 Denis Osin, Professor of Mathematics, Vanderbilt University.
 Nicolas Monod, Professor of Mathematics, EPFL, Lausanne.
 Sang-hyun Kim, Professor of Mathematics, Korea institute of advances study, Seoul.
 Tim Riley, Professor of Mathematics, Cornell University.