
DR. SAHANA H. BALASUBRAMANYA

Webpage : <http://hbsahana.com/math/index.htm>

PERSONAL INFORMATION

Date of Birth: 16 October, 1989
Email: hassanba@lafayette.edu

APPOINTMENTS

- 2023 – *Assistant Professor*, Department of Mathematical Sciences
Lafayette College, USA
- 2022 – 23 *Visiting Assistant Professor*, Department of Mathematics
State University of New York at Buffalo, USA
Mentors: Dr.Johanna Mangahas
- 2019 – 22 *Postdoctoral Research Associate*, Cluster of Excellence
Westfälische Wilhelms- Universität Münster, Germany
Mentor: Dr.Katrin Tent
- 2018 – 19 *Visiting Assistant Professor*, Department of Mathematics
The University of North Carolina at Greensboro, USA
Mentor: Dr.Talia Fernós

EDUCATION

- 2013 – 18 *Ph.D. Mathematics*, Vanderbilt University, Nashville, TN, USA
Thesis advisor: Dr. Denis Osin
Thesis title : Hyperbolic structures on groups
- 2013 – 15 *Master of Science Mathematics*, Vanderbilt University, Nashville, TN, USA
- 2010 – 12 *M.A. Mathematics*, Lady Shri Ram College for Women, University of Delhi, New Delhi, India
Result: First Division with Distinction
- 2007 – 10 *B.A. Mathematics*, Lady Shri Ram College for Women, University of Delhi, New Delhi, India
Result: First Division with Distinction

RESEARCH AREAS

- *Geometric group theory*: Constructing, studying and classifying (isometric) group actions on hyperbolic spaces, actions on products of hyperbolic spaces, quasi-parabolic actions, acylindrical actions and acylindrically hyperbolic groups
- *Applications of mathematics to economic theory*: Ground water conservation, Impact assessment

ACADEMIC AWARDS & HONORS

- 2024 Selected for Project NExT, 2024 Blue Cohort, Mathematical Association of America (MAA)
- 2023 Recipient of start-up grant, Lafayette College (USD 10,000)
- 2023 Selected for President's Postdoctoral Fellowship Program (PPFP), School of Mathematics, Georgia Institute of Technology (*declined*)
- 2022 Recipient of start-up grant, SUNY Buffalo (USD 5000)
- 2021 Selected for the 'Erstklassig!' mentoring program for postdoctoral researchers, University of Münster
Mentor: Dr.Ursula Hamenstädt, University of Bonn
- 2019-22 Awarded multiple travel grants from Cluster of Excellence, University of Münster
- 2020 Awarded Oberwolfach Leibniz Graduate (OWLG) Travel Grant, MFO
- 2019 Recipient of department travel grant, UNC Greensboro (USD 1000)
- 2018 B.F. Bryant Prize for Excellence in Teaching, Department of Mathematics, Vanderbilt University (USD 1000)
- 2015-17 Awarded Graduate student travel grants by the Graduate school, Vanderbilt University (USD 500 each year)
- 2012 Highest scorer in University of Delhi, South Campus for M.A.Mathematics, University of Delhi
- 2012 Best Student in Mathematics, Semesters III & IV for M.A. Mathematics, University of Delhi
- 2011 South Campus Endowment Scholarship for academic excellence, University of Delhi (Tuition covered)
- 2011 Best Student in Mathematics, Semesters I & II for M.A. Mathematics, South Campus, University of Delhi
- 2010 Scored among top 1% of students in B.A. Mathematics, University of Delhi
- 2009 Anupama Dua Scholarship for excellence in B.A. Mathematics, Lady Shri Ram College, University of Delhi (Tuition covered)

RESEARCH PUBLICATIONS

1. S.Balasubramanya, T. Fernós; *The semisimple Theory of Acylindricity for CAT(0) Cube Complexes*; In preparation.
2. S.Balasubramanya, T. Fernós; *AU-acylindrical actions and their quasi-isometrically embedded subgroups*; In preparation.
3. S.Balasubramanya, T.Fernós; *The semisimple theory of higher rank acylindricity*; arXiv:2407.04838v2 (2024, 76 pages, Submitted).
4. S.Balasubramanya, F. Fournier-Facio, M. Zaremsky; *Hyperbolic actions of Thompsons group F and generalizations*; arXiv:2406.12982 (2024, 60 pages, Submitted).
5. S.Balasubramanya, M.Chesser, A. Kerr, J. Mangahas, M.Trin; *A note on non-recognizing spaces for stable subgroups*; Accepted in Proceedings of the AMS (2025)(11 pgs).
6. S.H.Balasubramanya; *A survey on classifying group actions on hyperbolic spaces*; Topology at infinity of discrete groups (In honor of Prof. Mike Mihalik), AMS series Contemporary Mathematics, Vol. 812 (2025), 101-123(22 pgs).
7. S.Balasubramanya, F. Fournier-Facio, A.Genevois; *Property (NL) for hyperbolic group actions*, with Appendix by A.Sisto; arXiv:2212.14292; To appear in Groups, Geometry & Dynamics, (2023), (44 pgs).
8. C.Abbott, S. Balasubramanya, A.J.Rasmussen; *Valuations, completions and hyperbolic actions of metabelian groups*, with Appendix A co-authored with S.Payne; Journal of the London Mathematical Society, Volume 109, Issue 6 e12916 (2024), pg 1 -72 (72 pgs).
9. C.Abbott, S. Balasubramanya, A.J.Rasmussen; *Higher rank confining subsets and actions of solvable groups*; Advances in Mathematics, Volume 424 (2023), 109-145 (34 pgs).
10. S. H Balasubramanya; *Finite extensions of \mathcal{H} - and \mathcal{AH} -accessible groups*; Topology Proceedings Volume 56 (2020), pg 297-304 (8 pgs).
11. S. H Balasubramanya; *Hyperbolic structures on wreath products*; Journal of Group Theory (2020), ISSN (Print) pg 357-383 (27 pgs).
12. C. Abbott, S. Balasubramanya, D. Osin; *Hyperbolic structures on groups*; Algebraic & Geometric Topology 19-4 (2019), pg 1747-1835 (89 pgs).
13. S. H Balasubramanya; *Acylindrical group actions on quasi-trees*; Algebraic & Geometric Topology 17 (2017) pg 2145-2176 (32 pgs).

APPLIED MATH PAPERS (ECONOMIC THEORY)

1. S. Balasubramanya, S. Balasubramanya, A.Mitra; *Positive incentives for ground water*, In preparation.
2. Balasubramanya, S., Balasubramanya, S., Brozovic, N., Buisson, M., Chandra, A., Durga, N., Kafle, K., Kishore, A., Minh, T., Mitra, A., Mukherji, M., Ringler, C., Schmitter, P., Varshney, D., Verma, S., Yashodha, Y.; *Solar irrigation in South Asia and Sub-Saharan Africa: opportunities, challenges, risk and knowledge gaps*; *Background paper for The World Bank Flagship Report on Groundwater*; Accepted into Science, 2024.
3. (Assisted with) S. Balasubramanya, J. Price, T. Horbulyk; *Impact assessments without true baselines: assessing the relative effects of training on the performance of water user associations in Southern Tajikistan*; Water Economics and Policy (2017), 4(3), pp. 1850007.

RESEARCH WITH UNDERGRADUATES (* denotes an undergraduate coauthor)

1. S.Balasubramanya, G. Burkhalter*, R.Niebler*, R. Shapiro; *Property (NL) in Coexter groups*; arXiv:2404.15459, (2024, 11 pgs, Submitted).

LANGUAGES

- o Programming languages: R, LaTeX, C++, Qbasic, FORTRAN
- o Fluent in English and Hindi (Native), German (B1/B2 level)

TEACHING EXPERIENCE

<i>Lafayette College</i>	Spring 2025	– Instructor, Calculus II (2 sections)
		– Instructor, Introduction to Probability & Statistics
	Fall 2024	– Instructor, Introduction to proofs and theoretical maths (with HUB MSG run by Zoey Zhou)
		– Instructor, Geometry
	Spring 2024	– Instructor, Calculus I
		– Instructor, Vector Spaces
	– Participated in the Student Pedagogical Partnership Program, CITLS	
	Fall 2023	– Instructor, Calculus III (2 sections)
		– Designing Your First Lafayette Courses, Online Module Certificate; Designed by the CITLS and Learning & Research Technologies
<i>SUNY Buffalo</i>	Spring 2023	– Instructor, College Calculus III (2 sections) Supervised 3 TA's and 1 grader
	Fall 2022	– Instructor, Survey of Calculus and Applications I (2 sections) Supervised 2 TA's and 1 grader
<i>Summer Schools</i>	May 2022	– Instructor, Introductory course on hyperbolic groups and boundaries – ICMAT (Ian Agol Lab), Spain
	June 2020	– Instructor, Mini-course on Acylindrically and Relatively hyperbolic groups, Geometric group theory without boundaries II
<i>University of Münster</i>	Fall 2021	– Teaching Assistant, Geometric Group Theory II
<i>UNC Greensboro</i>	Spring 2019	– Instructor, Calculus I (1 section), Calculus II (2 sections) Supervised 2 graders
	Fall 2018	– Instructor, Pre-Calculus (2 sections), Calculus I (1 section) Supervised 1 grader
<i>Vanderbilt University</i>	Spring 2018	– Instructor, Calculus 1301 Supervised 1 TA
	Spring 2017	– Teaching Assistant, Calculus 1301
	Fall 2016	– Instructor, Calculus 1200 Supervised 1 TA
	Spring 2016	– Teaching Assistant, Calculus 1301
	Fall 2015	– Instructor, Statistics Laboratory
	Spring 2015	– Teaching Assistant, Probability and Statistics
	Fall 2014	– Teaching Assistant, Calculus 1200
	Spring 2014	– Teaching Assistant, Linear Algebra
	Fall 2013	– Grader, Calculus 1301

SERVICE – OUTREACH – LEADERSHIP

- Math & Art*
- JMM 2024 : Choreographed and presented *Science in Sacred spaces*- A dance presentation based on South Indian Temple architecture, set in Bharatanatyam
 - International students association Grand Finale 2024 : Presented *Science in Sacred spaces*
- REU Experience*
- Mentor and Project leader: Property (NL) in Coxeter groups REU at Georgia Tech University, Summer 2023; Supervised by Dan Margalit
- Conference organizer*
- Organized a panel on “Mentor Mosaic – Mentoring and advising undergraduates” Project NExT, JMM, 2025
 - Special session on Geometric group theory, 57th STDC, UNC Charlotte, March 6–9, 2024
 - AMS Special session on Geometric Group Theory, Georgia Tech University, 2023 (with Dan Margalit, Ryan Dickmann, Abdoul Karim Sane)
 - NCNGT, Topics group on ‘Group actions on hyperbolic metric spaces’, 2022 (with Alex Rasmussen)
- Project Leader*
- Projection complexes and course cubulations (with J. Mangahas); Women in Groups, Geometry and Dynamics (WiGGD) Workshop, July 2023
- Committee member*
- Bratati Som, PhD candidacy exam, SUNY Buffalo
 - Arya Vadnere, PhD candidacy exam, SUNY Buffalo
- Mentor*
- Math Alliance Project, August 2024 – present
- Served as a Referee*
- Journal of group theory
 - Journal of Pure & Applied Algebra
 - Bulletin of the LMS
 - Michigan Math Journal
 - Journal of Topology and Analysis
 - Journal of Group Theory
 - Journal of Pure and Applied Algebra
- Lafayette College*
- Service to the College*
- Representative from the Division of Math and Sciences, Off-Campus Studies Advisory Committee, Fall 2024 – present
 - Garba demonstration, Diwali celebrations, Fall 2024
 - Performer, *Performing the Trail*, Lafayette Arts week, Fall 2024
 - Presented a Lecture-demonstration on Indian classical dances with Prof. Nandini Sikhand, Lafayette Arts week, Fall 2024
 - Panel member, Faculty panel on the university system and classroom culture, International Orientation, Fall 2024
 - Panel member, AAPI Faculty Panel for Heritage month, Spring 2024
 - Volunteer, Breakfast at Midnight, Fall 2023
 - International Friendship Partner, Fall 2023 – present
 - CaPA advisor to Shreya Suresh, Lafayette College, Spring 2024 – present
- Service to the Department*
- Committee member, Kovalevsky society, Dept. of Mathematical Sciences, Fall 2024
 - Cryptography contest organizer/speaker, Dept. of Mathematical Sciences, Spring 2024 – present
- SUNY Buffalo*
- Designed *Handbook for Incoming International Math Graduate Students*, 2022
- University of Münster*
- MM Departure Talk : Applying for academic jobs in the USA vs Europe, Fall 2022
 - Mentor, MINT mentoring program for women in math (Masters students), 2022–24
Mentees: Annagret Wittig, Jorunn Mense, Doris Grothusmann
 - Member, Task force to help mathematicians from Ukraine, Spring 2022
 - Organizer, GGT Seminar, Spring 2022

- Member, W2 Appointment Committee, Dept. of Mathematics, 2021
- Organizer and Volunteer, MM Buddy Program, 2020–22
- Organizer, MM Connect sessions, 2020–21
- Member, W2 Appointment Committee, Dept. of Mathematics, 2021
- Organizer and Volunteer, MM Buddy Program, 2020–22
- Organizer, MM Connect sessions, 2020–21
- Organizer, Welcome Center Event meets MM, 2020
- Organizer, MMGS Retreat for PhD students, 2020–22
- MM Impulse talk on postdoctoral job market preparation in academia, 2019

- UNC Greensboro*
- Academic career panel member, AWM conference, Wake Forest University, 2019
 - House calls Volunteer, Housing and Residence Living, 2018
 - Chair, Diversity Committee, Department of Mathematics and Statistics, 2018–19
 - Organizer, Ping-Pong seminar between UNCG and Wake Forest University, 2018–19
 - Member, State Math Contest Committee, Department of Mathematics and Statistics, 2018

- Vanderbilt University*
- Vanderbilt Global Ambassador, 2013–18
 - Graduate student teaching assistant panel member, 2016–18
 - Helped organize several conferences, 2013–18

- University of Delhi*
- Talk on ‘Career prospects in Mathematics’, Lady Sri Ram College, 2021 (*Virtual*)
 - Organized several seminars at Department of Mathematics, 2007–12
 - Editorial Board, ‘Quantum- A Mathematical Gazette’, Lady Shri Ram College, 2008–10

LIST OF TALKS (SEMINARS & CONFERENCES)

Upcoming talks

- March 6-8, 2025: Semi-plenary speaker, GGT session, STDC 2025
- April 7-11, 2025: Visiting Oklahoma University (Jing Tao)
- May 19, 2025: Topology seminar “Prospectos en Topología” at UNAM Morelia (*Virtual*)
- June 9 -13, 2025: GAGTA, Stevens Inst, NJ (Only attending; reg req on jan 4, 2025, check about this)
- June 29-4 July, 2025: Bridson 60th birthday conference, Dublin (Poster)
- ? July 8- 11, 2025: MOST Program, NYC Museum of Math
- July 28 - Aug 1, 2025: Summer school in Hawaii (Yash Lodha)
- August 6-10, 2025: Project NeXT, MAA Math Fest, Sacramento
- ? Aug 31 - Sept 20, 2025: Cambridge visit/Actions on trees conference

- 2024
- Geometry and Topology seminar, Vanderbilt University
 - International Young Seminar on Bounded Cohomology and Simplicial Volume (*Virtual*)
 - Topology and Geometry seminar, Temple University
 - Groups, Logic and Dynamics (GLaD) meeting, Rutgers University
 - Topology seminar, UT Knoxville
 - UW Milwaukee Topology seminar (*Virtual*)
 - AMS special session on Geometric Group Theory III, JMM
 - AMS contributed paper session on Topological groups, Lie Groups and Group Theory, JMM

- 2023
- GGT online seminar series, UNAM, Mexico (*Virtual*)
 - Combinatorics, Algebra & Geometry (CAGE) seminar, Penn State & Drexel Univ, USA
 - 60th birthday conference of Prof. Katrin Tent), University of Münster, Germany
 - Geometry, Topology and Dynamics seminar, Boston College, USA
 - World of GroupCraft III, USA (*Virtual*)
 - Interactions between Algebraic Topology and GGT, BIRS-CMO Conference, Oaxaca, Mexico
 - Geometry and Topology seminar, Binghamton University, USA
 - Algebra and Topology seminar, SUNY Albany, USA
 - Special session for Mike Mihalik’s 70th birthday, AMS Sectional meeting, University of Cincinnati, USA
 - Topology and Geometric group theory seminar, Cornell University, USA

- Max Dehn seminar, University of Utah, USA
 - Hyperbolic Lunch seminar, University of Toronto, Canada
 - Seminar talk, Skidmore College, USA
 - MAAD talk, Lafayette College, USA
- 2022
- Algebra Seminar, Niagara University , USA
 - World of GroupCraft (*Virtual*)
 - Group theory seminar, ETH Zürich
 - Groups in Galway meets the Irish Geometry Conference, National University of Ireland (*Virtual*)
 - Group theory seminar, SUNY Buffalo, USA (*Virtual*)
- 2021
- Geometric Group Theory Seminar, WWU Münster, Germany
 - Geometry and Analysis on Groups Research Seminar, University of Vienna, Austria
 - Algebra, Geometry and Topology seminar, Universidad Madrid, Spain
 - Geometric Group Theory in East Asia, GGTea webinar (*Virtual*)
 - Geometry and Topology seminar, CUNY, USA (*Virtual*)
 - Geometry and Topology seminar, Rice University, USA (*Virtual*)
 - Post Graduate Topology Conference, University of Southampton, UK (*Virtual*)
- 2020
- Advanced seminar on Model Theory and Groups, WWU Münster, Germany
 - Geometric Structures in Group Theory workshop, MFO Oberwolfach, Germany
 - Geometric Group Theory conference, CIRM, Luminy France
 - Lightning talk, YGGT IX, Saint Jacut-de-la-mer, France
- 2019
- Advanced seminar on Model Theory and Groups, WWU Münster, Germany
 - Geometric Group Theory Seminar, WWU Münster, Germany
 - WWU Münster Mathematics department colloquium “Meet the postdocs”, Germany
 - Spring Topology and Dynamics Conference, University of Alabama at Birmingham, USA
 - Seminar talk, Spelman College, USA
 - Geometry Seminar, University of Virginia, USA
 - Seminar talk, Furman University, USA
 - Topology and Geometric Group Theory Seminar, Cornell University, USA
 - Group Theory and Topology seminar, Vanderbilt University, USA
- 2018
- Lightning Talk, Tech Topology Conference, Georgia Tech University, USA
 - AMS Sectional Meeting, University of Arkansas, USA
 - Geometry-Topology Seminar, Duke University, USA
 - GANTC (Geometry, Algebra, Number Theory and Combinatorics) seminar, UNC Greensboro, USA
 - WINRS symposium - Mid Atlantic Region, University of Virginia, USA
 - Summer Conference on Topology and its Applications, Western Kentucky University, USA
 - AMS Sectional Meeting, Vanderbilt University, USA
 - Colloquium Series, Gettysburg College, USA
 - AMS Special Session on Boundaries for Groups and Spaces, Joint Mathematics Meeting, USA
 - AMS Contributed Paper Session on Groups, Joint Mathematics Meeting, USA
- 2017
- Geometric Group Theory seminar, Ohio State University, USA
 - Algebra seminar, Loyola University, USA
 - Geometry and Topology seminar, Graduate Centre, CUNY, USA
 - Wasatch Topology Conference, Utah, USA
 - yGAGTA Conference, Spain
 - Research Seminar, Women and Math program, IAS, Princeton, USA
 - 51st Spring Topology and Dynamics Conference, New Jersey City University, USA
 - Geometric group theory on the gulf (G^3) conference, Florida, USA
 - Group theory and Topology seminar, Vanderbilt University, USA
- 2016
- Group theory and Topology seminar, Vanderbilt University, USA
 - Poster presentation, YGGT V, KIT, Karlsruhe, Germany

SUMMER SCHOOLS, WORKSHOPS & CONFERENCES ATTENDED

- 2024
 - Canaryfest 6.2: In honor of the 60th birthday of Prof. Richard Canary, Cetraro, Italy
 - Project NExT Mathfest, Indianapolis, Indiana, USA
 - GeMTRAK, University of Pennsylvania, USA
- 2022
 - Lean for the curious mathematician, ICERM (*Virtual*)
 - Hyperbolic groups and their generalizations, IHP, Paris, France
- 2021
 - Buildings Conference, Universität Magdeburg, Germany
 - Counting Problems, Ventotene, Italy
 - YGGT X, Newcastle University (*Virtual*)
 - Modern Leadership is Female, WWU, Germany
- 2020
 - Topology Postdoc Workshop, Georgia Tech, USA
 - BiMs Seminar, Bielefeld Universität, Germany
- 2019
 - Miniworkshop - Geometric Group Theory, LMU, Germany
- 2017
 - GAGTA, Spain
- 2016
 - ‘Beyond Hyperbolicity’, Cambridge University, UK
 - Shanks workshop on Geometric Group Theory, Vanderbilt University, USA
- 2015
 - Summer school at EPFL -CIB: Probability on graphs and random walks, Switzerland
 - MSRI Geometric Group Theory Summer Graduate School, MSRI Berkeley, USA

PROFESSIONAL MEMBERSHIPS

- 2024–25 MAA
- 2023–26 AMS (Faculty)
- 2017 IAS Women and Math
- 2013–18 AMS (Graduate student)

MEDIA COVERAGE

- Articles discussing the *Science* paper:
 - Forbes, April 2024
 - Yale Environment 360, February 2024
 - Environmental News network, January 2024
 - Waterloo News, January 2024
 - MyScience, January 2024
 - TechXplore, January 2024
 - Heise online (German), January 2024
- Today at Elon (JMM Math Variety Show Review), January 2024
- JMM Math and Dance piece description, January 2024
- Lecture on *Actions of solvable groups on hyperbolic spaces*, Banff International Research Station, Interactions between Algebraic Topology and Geometric Group Theory, Casa Mathematics Oaxaca, May 2023
- Lecture on *(Non-) recognising spaces for stable subgroups*, World of Groupcraft, September 2023
- Lecture on *Property (NL) for hyperbolic actions*, World of Groupcraft, September 2023
- Math and Dance, Interview at ICMAT, Spain, June 2022
- Minicourse on *Acylindrically and Relatively hyperbolic groups*, Geometric group theory without borders, June 2021
- Lecture on *Quasi-parabolic structures on groups*, CIRM Virtual event, June 2020
- PhD to Postdoc: Dr. Sahana H Balasubramanya, Interview for WWU Münster, January 2020
- B.F. Bryant Award for Excellence in Teaching, May 2018
- Lecture on *Acylindrically hyperbolic structures on groups*, WAM program, IAS, Princeton, 2017

EXPOSITORY WRITING

1. *Reproducing Kernel Hilbert spaces* (with M. Kumar), *Éclat - A Mathematics Journal*, Department of Mathematics, Lady Shri Ram College for Women, Volume IV, 2013
2. *Holonomy group of a Surface*, *Éclat - A Mathematics Journal*, Department of Mathematics, Lady Shri Ram College for Women, Volume III, 2012
3. *Complex Integration*, *Éclat - A Mathematics Journal*, Department of Mathematics, Lady Shri Ram College for Women, Volume II, 2011

NON ACADEMIC WRITING

- *Dear Parker Pen Company*, Global Expressions - Writing Beyond the Mother Tongue, Lafayette College September 2024