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# DR. SAHANA H. BALASUBRAMANYA

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

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## PERSONAL INFORMATION

Date of Birth: 16 October, 1989  
Email: [hbsahana@gmail.com](mailto:hbsahana@gmail.com)  
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## 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 Wilhems- 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
- *Model theory*: First order theory of countable graphs, first order rigidity
- *Applications of mathematics to economic theory*: Ground water conservation, Impact assessment

## ACADEMIC AWARDS & HONORS

- 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)

## PUBLICATIONS

- S.Balasubramanya, T.Fernós; *The semi-simple theory of higher rank acylindricity*; In preparation.
- S.Balasubramanya, T. Fernós; *AU-acylindrical actions and their quasi-isometrically embedded subgroups*; In preparation.
- S.Balasubramanya, F. Fournier-Facio, M. Zaremsky; *Hyperbolic actions of Thompsons group F*; In preparation.
- S.Balasubramanya, M.Chesser, A. Kerr, J. Mangahas, M.Trin; *A note on non-recognizing spaces for stable subgroups*; arXiv:2311.15187 (2023, 11 pgs, Submitted).
- S.H.Balasubramanya; *A survey on classifying group actions on hyperbolic spaces*; Provisionally accepted in Topology at infinity of discrete groups, AMS series Contemporary Mathematics, 2024, 22 pgs.
- 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.
- C.Abbott, S. Balasubramanya, A.J.Rasmussen; *Valuations, completions and hyperbolic actions of metabelian groups*, with Appendix A co-authored with S.Payne; arXiv:2207.12945; To appear in Journal of the London Mathematical Society, 2024, 67 pgs.
- C.Abbott, S. Balasubramanya, A.J.Rasmussen; *Higher rank confining subsets and actions of solvable groups*; arXiv:2108.08175; To appear in Advances in Mathematics, 2023, 34 pgs.
- S. H Balasubramanya; *Finite extensions of  $\mathcal{H}$ - and  $\mathcal{AH}$ -accessible groups*; Topology Proceedings Volume 56 (2020), pg 297-304 (8 pgs).
- S. H Balasubramanya; *Hyperbolic structures on wreath products*; Journal of Group Theory (2020), ISSN (Print) pg 357-383 (27 pgs).
- C. Abbott, S. Balasubramanya, D. Osin; *Hyperbolic structures on groups*; Algebraic & Geometric Topology 19-4 (2019), pg 1747-1835 (89 pgs).
- S. H Balasubramanya; *Acylindrical group actions on quasi-trees*; Algebraic & Geometric Topology 17 (2017) pg 2145-2176 (32 pgs).

## APPLIED MATH PAPERS (ECONOMIC THEORY)

- S. Balasubramanya, S. Balasubramanya, A.Mitra; *Positive incentives for ground water*, In preparation.
- 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, 2023.
- (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)

- S.Balasubramanya, G. Burkhalter\*, R.Niebler\*, R. Shapiro; *Property (NL) in Coexter groups*; In preparation.

## LANGUAGES

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

## TEACHING EXPERIENCE

<i>Lafayette College</i>	Spring 2023	– Instructor, Calculus I
		– Instructor, Vector Spaces
	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
- REU Experience* ○ Mentor and Project leader: Property (NL) in Coxeter groups  
REU at Georgia Tech University, Summer 2023; Supervised by Dan Margalit
- Conference organizer* ○ Special session on Geometric group theory, 57<sup>th</sup> 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
- Served as a Referee* ○ Bulletin of the LMS  
○ Michigan Math Journal  
○ Journal of Topology and Analysis
- Lafayette College* ○ Volunteer, Breakfast at Midnight, 2023  
○ International Friendship Partner, 2023
- 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  
○ 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  
○ Instructor in Bharatanatyam, Vanderbilt Dance Program, 2014–18  
○ 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

- 2024
  - Groups, Logic and Dynamics (GLaD) meeting, Rutgers University, New Brunswick
  - 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

- 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