

curriculum vitae
Apoorva Khare

*Analysis and Probability Research Group; and
Department of Mathematics
Indian Institute of Science
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POSITIONS HELD

Indian Institute of Science, Bangalore, India
Associate Professor in Mathematics *2020 – present*
Assistant Professor in Mathematics *2017 – 2020*
Analysis and Probability Research Group, Bangalore: Member *2017 – present*
Stanford University, Stanford, USA *2011 – 2017*
Research Associate in Mathematics and Statistics
Yale University, New Haven, USA *2009 – 2011*
Lecturer in Mathematics
University of California at Riverside, Riverside, USA *2006 – 2009*
Visiting Assistant Professor in Mathematics

POSITIONS – OTHER

Fellow of the Indian Academy of Sciences (Bangalore) *2022+*
SwarnaJayanti Fellow of SERB and DST, Govt. of India (Delhi) *2020 – 2025*
Ramanujan Fellow of SERB, Govt. of India (Delhi) *2018 – 2023*
Young Investigator of Infosys Foundation, India (Bangalore) *2017 – 2019*

EDUCATION

University of Chicago, Chicago, USA *2000 – 2006*
Ph.D. in Mathematics, June 2006
M.S. in Mathematics, December 2001
Lecturer of Mathematics in the College
Indian Statistical Institute, Kolkata, India *1997 – 2000*
B. Stat. (Hons.), June 2000: Graduated First Class with Distinction

SHORT ACADEMIC VISITS

American Institute of Mathematics, Pasadena, CA, USA (upcoming) *Jul 2023*
University of Delaware, Newark, DE, USA *Aug 2022*
University of Delaware, Newark, DE, USA *Dec 2021*
University of Delaware, Newark, DE, USA *Jan–Feb 2020*
University of California at Los Angeles, Los Angeles, CA, USA *Sep–Oct 2018*
American Institute of Mathematics, San Jose, CA, USA *Nov 2016*
International Centre for Mathematical Sciences, Edinburgh, UK *Aug 2016*

SHORT ACADEMIC VISITS (cont.)

<i>University of Illinois at Chicago</i> , Chicago, IL, USA	<i>Sep–Oct 2015</i>
<i>Harish-Chandra Research Institute</i> , Allahabad, India	<i>Dec 2014</i>
<i>American Institute of Mathematics</i> , Palo Alto, CA, USA	<i>Oct 2014</i>
<i>Institut Fourier</i> , Grenoble, France	<i>Jun 2008</i>
<i>Tata Institute of Fundamental Research</i> , Mumbai, India (<i>Nurture Program</i>)	<i>Jun 2000</i>
<i>Tata Institute of Fundamental Research</i> , Mumbai, India (<i>VSRP</i>)	<i>Dec 1999</i>
<i>Tata Institute of Fundamental Research</i> , Mumbai, India (<i>Nurture Program</i>)	<i>Jun 1999</i>
<i>Tata Institute of Fundamental Research</i> , Mumbai, India (<i>Nurture Program</i>)	<i>Jun 1998</i>
<i>International Mathematical Olympiad Training Camp</i> , Mumbai, India	<i>May 1997</i>
<i>International Mathematical Olympiad Training Camp</i> , Mumbai, India	<i>May 1996</i>

SELECTED TALKS

- *AMS Joint Mathematics Meetings* (JMM, Boston, USA): *2023*
ILAS Invited Address (Plenary) (upcoming)
- *Indian Mathematical Society*, 88th Annual Conference (BIT Mesra): *2022*
Hansraj Gupta Memorial Award Lecture (upcoming)
- *Formal Power Series and Algebraic Combinatorics* (FPSAC) Meeting (India): *2022*
Invited (Plenary) talk
- *4th BRICS Mathematics Conference*, IISER Thiruvananthapuram – **Invited talk** *2021*
- *Ramanujan Mathematical Society*, 36th Annual Conference (Amrita University): *2021*
Invited talk (Semiplenary)
- *International Linear Algebra Society* (ILAS) Meeting (Brazil): *2019*
Plenary speaker (designated as the *LAMA Lecturer*)
- *20th Professor Wazir Hasan Abdi Memorial Lecture*, *2019*
Cochin University of Science and Technology (CUSAT)
- *ICM Satellite Conference* (International Congress of Mathematicians) *2018*
on Representation Theory (Peru): **Invited talk**
- *MCA 2017* (Mathematical Congress of the Americas, Canada) *2017*
Sectional talk: Representations of Lie Algebras

RESEARCH GRANTS AND AWARDS

- *American Institute of Mathematics*: **Research award** to co-organize *2023*
a workshop (with full funding for ~ 30 participants) on
“Theory and applications of total positivity”
- SwarnaJayanti Fellowship (**Research grant**) in Mathematics *2020 – 2025*
Funding Agencies: Department of Science and Technology (DST), Govt. of India,
and Science and Engineering Research Board (SERB), Govt. of India
Grants # *DST/SJF/MS/2019/3* and # *SB/SJF/2019-20/14*
(Sole PI; Direct costs: Rs. 970,000 \approx \$13,000 per year)

RESEARCH GRANTS AND AWARDS (cont.)

- Ramanujan Fellowship (**Research grant**) in Mathematics 2018 – 2023
Funding Agency: Science and Engineering Research Board (SERB), DST, Govt. of India
 Grant # *SB/S2/RJN-121/2017*
 (Sole PI; Direct costs: Rs. 700,000 \approx \$10,500 per year)
- MATRICS **Research grant** in Mathematics 2018 – 2021
Funding Agency: Science and Engineering Research Board (SERB), DST, Govt. of India
 Grant # *MTR/2017/000295*
 (Sole PI; Direct costs: Rs. 200,000 \approx \$3,000 per year)
- Infosys Young Investigator **Research grant** 2017 – 2019
Funding Agency: Infosys Foundation, India
 (Sole PI; Direct costs: Rs. 600,000 \approx \$9,000 per year)
- *International Centre for Mathematical Sciences (Edinburgh, UK):* 2016
Research award from RiG (Research-in-Groups) programme
 (Co-PI; Direct costs: £9,000 \approx \$13,140)
- *American Institute of Mathematics:* **Research award** to co-organize 2014
 a workshop (with full funding for 31 participants) on “Positivity,
 graphical models, and modeling of complex multivariate dependencies”
- **Research grant** # *DARPA YFA N66001-11-1-4131* 2011 – 2013
Funding Agency: Defense Advanced Research Projects Agency (DARPA), USA
 (Co-Investigator; PI: Bala Rajaratnam; \$150,000 per year)

ACADEMIC GRANTS, AWARDS, AND SCHOLARSHIPS

- *Tata Trusts, via Indian Institute of Science:* Travel Grant 2019,20
- *ILAS-LAMA* Travel Support for delivering a Plenary talk (the LAMA Lecture) 2019
 at ILAS 2019 in Rio, Brazil
- *Indian Institute of Science:* Travel Support Grant 2019
- *NSF and NSA (USA):* Travel Award for presenting a poster 2016
 at FPSAC 2016 in Vancouver, Canada
- *University of Chicago:* Robert R. McCormick Fellowship 2000 – 2002
- *National Board of Higher Mathematics:* Nurture Program award 1998, 1999
- *Indian Statistical Institute at Kolkata:* Academic excellence award 1998
- *Indian Statistical Institute at Kolkata:* Student Fellowship 1997 – 2000
- Indian National Mathematical Olympiad (INMO) Scholarship 1996
- Award from Odisha Mathematical Society for securing 1995, 1996
 first place in Regional Mathematical Olympiads
- National Talent Search Examination (NCERT, Govt. of India) Scholarship 1995

OTHER DISTINCTIONS

- Elected a *Fellow of the Indian Academy of Sciences*, Bangalore (India) 2022+
- *DST (Dept. of Science & Technology)* and *Vigyan Prasar*, Government of India: 2022
 One of 75 scientists profiled in the book “75 under 50: Scientists Shaping Today’s India”
- Elected to *Board of Directors*, International Linear Algebra Society 2021 – 2024

OTHER DISTINCTIONS (cont.)

- *Tarun Tejankit Puraskar* by Loksatta newspaper, Mumbai (India) 2019
- *Indian Institute of Science*: Selected by Office of Divisional Chair to showcase research in the 2017 annual Court Report 2018
- *Editorial Boards* (see ‘Service’): Indian Journal of Pure and Applied Mathematics; Acta Scientiarum Mathematicarum (Szeged); Linear and Multilinear Algebra; São Paulo Journal of Mathematical Sciences; Texts and Readings in Mathematics (TRIM) Series

SELECTED PUBLICATIONS (*see Publication List* for full list)**Published/in press:**

- (1) (**Book.**) *Matrix analysis and entrywise positivity preservers*, 2022.
Vol. 471 in London Mathematical Society Lecture Note Series, Cambridge University Press, xxii+292 pp.; and Vol. 82 in Texts and Readings In Mathematics (TRIM Series), Hindustan Book Agency, xxii+339 pp.
- (2) (With Alexander Belton, Dominique Guillot, and Mihai Putinar.) *Totally positive kernels, Pólya frequency functions, and their transforms*, Journal d’Analyse Mathématique (63 pp.), in press.
- (3) (With Alexander Belton, Dominique Guillot, and Mihai Putinar.) *Moment-sequence transforms*, Journal of the European Mathematical Society, 24(9):3109–3160, 2022.
- (4) *Smooth entrywise positivity preservers, a Horn–Loewner master theorem, and symmetric function identities*, Transactions of the American Mathematical Society, 375(3):2217–2236, 2022.
- (5) (With Gurbir Dhillon.) *The weights of simple modules in Category \mathcal{O} for Kac–Moody algebras*, Journal of Algebra, 603:164–200, 2022.
- (6) (With Alexander Belton, Dominique Guillot, and Mihai Putinar.) *Hirschman–Widder densities*, Applied and Computational Harmonic Analysis, 60:396–425, 2022.
- (7) (With Terence Tao.) *On the sign patterns of entrywise positivity preservers in fixed dimension*, American Journal of Mathematics, 143(6):1863–1929, 2021.
- (8) (With Projesh Nath Choudhury and M. Rajesh Kannan.) *Sign non-reversal property for totally non-negative and totally positive matrices, and testing total positivity of their interval hull*, Bulletin of the London Mathematical Society, 53(4):981–990, 2021.
- (9) (With Carolina Benedetti, Rafael S. González D’León, Christopher R.H. Hanusa, Pamela E. Harris, Alejandro H. Morales, and Martha Yip.) *A combinatorial model for computing volumes of flow polytopes*, Transactions of the American Mathematical Society, 372(5):3369–3404, 2019.
- (10) (*Survey article*, peer-reviewed, with A. Belton, D. Guillot, and M. Putinar.) *A panorama of positivity*: arXiv:math.CA/1812.05482 (unified version).
 - *Part I: Dimension free*, in *Analysis of Operators on Function Spaces* (The Serguei Shimorin Memorial Volume; A. Aleman, H. Hedenmalm, D. Khavinson, M. Putinar, Eds.), pp. 117–165, Trends in Mathematics, Birkhauser, 2019.
 - *Part II: Fixed dimension*, in *Complex Analysis and Spectral Theory*, Proceedings of the CRM Workshop held at Laval University, QC, May 21–25, 2018 (G. Dales, D. Khavinson, J. Mashreghi, Eds.). CRM Proceedings – AMS Contemporary Mathematics 743, pp. 109–150, American Mathematical Society, 2020.

SELECTED PUBLICATIONS (cont.)

Published:

- (11) (As D.H.J. Polymath: with Tobias Fritz, Siddhartha Gadgil, Pace Nielsen, Lior Silberman, and Terence Tao.) *Polymath14: Homogeneous length functions on groups*, *Algebra & Number Theory*, 12(7):1773–1786, 2018.
- (12) *Generalized nil-Coxeter algebras over discrete complex reflection groups*, *Transactions of the American Mathematical Society*, 370(4):2971–2999, 2018.
- (13) (With Gurbir Dhillon.) *Faces of highest weight modules and the universal Weyl polyhedron*, *Advances in Mathematics*, 319:111–152, 2017.
- (14) (With Bala Rajaratnam.) *The Hoffmann-Jørgensen inequality in metric semigroups*, *Annals of Probability*, 45(6A):4101–4111, 2017.
- (15) (With Dominique Guillot and Bala Rajaratnam.) *Preserving positivity for rank-constrained matrices*, *Transactions of the American Mathematical Society* 369(9):6105–6145, 2017.
- (16) *Standard parabolic subsets of highest weight modules*, *Transactions of the American Mathematical Society* 369(4):2363–2394, 2017.
- (17) (With Alexander Belton, Dominique Guillot, and Mihai Putinar.) *Matrix positivity preservers in fixed dimension. I*, *Advances in Mathematics* 298:325–368, 2016.
- (18) (With Dominique Guillot and Bala Rajaratnam.) *Preserving positivity for matrices with sparsity constraints*, *Transactions of the American Math. Society* 368(12):8929–8953, 2016.
- (19) (With Dominique Guillot and Bala Rajaratnam.) *Critical exponents of graphs*, *Journal of Combinatorial Theory, Series A* 139:30–58, 2016.
- (20) *Faces and maximizer subsets of highest weight modules*, *Journal of Algebra* 455:32–76, 2016.
- (21) (With Akaki Tikaradze.) *On Category \mathcal{O} over triangular generalized Weyl algebras*, *Journal of Algebra* 449:687–729, 2016.
- (22) (With Peter Diao, Dominique Guillot, and Bala Rajaratnam.) *Differential calculus on graphon space*, *Journal of Combinatorial Theory, Series A* 133:183–227, 2015.
- (23) (**Book**, with Anna Lachowska.) *Beautiful, Simple, Exact, Crazy: Mathematics in the Real World* (480 pp.), Yale University Press, 2015.
- (24) (*Invited survey article*, peer-reviewed.) *Representations of complex semi-simple Lie groups and Lie algebras*, in *Connected at Infinity II: A Selection of Mathematics by Indians* (Rajendra Bhatia, Conjeevaram S. Rajan, and Ajit I. Singh, Eds.), TRIM, Hindustan Book Agency, pp. 85–129, 2013.
- (25) (With Wee Liang Gan.) *Quantized symplectic oscillator algebras of rank one*, *Journal of Algebra* 310(2):671–707, 2007.

Submitted:

- (26) (With G. Krishna Teja.) *A weight-formula for all highest weight modules, and a higher order parabolic category \mathcal{O}* (2022), arXiv:math.RT/2203.05515.
- (27) (With Projesh Nath Choudhury.) *The blowup-polynomial of a metric space: connections to stable polynomials, graphs and their distance spectra* (2021), arXiv:math.MG/2105.12111.

PROFESSIONAL SERVICE*A. EDITORIAL*

- Editor, Acta Scientiarum Mathematicarum (Szeged) *2022 – present*
- Editor, Indian Journal of Pure and Applied Mathematics *2020 – present*
- Editor, Linear and Multilinear Algebra *2020 – present*
- Editor of “Texts and Readings in Mathematics” (TRIM) Series, Hindustan Book Agency *2018 – present*
- Associate Editor, São Paulo Journal of Mathematical Sciences *2018 – present*
- Guest Editor, Journal of Indian Institute of Science (Special volume on “Number Theory and Representation Theory”) *2022*
- Proceedings Editor, Volume 80B, Séminaire Lotharingien de Combinatoire *2018*

B. OTHER

- Board of Directors, International Linear Algebra Society *2021 – 2024*

C. REFEREEING

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| <ul style="list-style-type: none"> • Transactions of the American Math. Society • International Math. Research Notices IMRN • Israel Journal of Mathematics • Journal of Combinatorial Theory Series A • Journal of Geometric Analysis • Mathematische Zeitschrift • Journal of Algebra • Bulletin of the London Mathematical Society • Pacific Journal of Mathematics • Kyoto Journal of Mathematics • Journal of Non-commutative Geometry • Letters in Mathematical Physics | <ul style="list-style-type: none"> • AMS Contemporary Mathematics • Linear Algebra and its Applications • Indian J. Pure and Applied Math. • Discrete Mathematics • Linear and Multilinear Algebra • Communications in Algebra • Algebras and Representation Theory • Journal of Algebra and its Applications • Electronic Journal of Linear Algebra • Bull. Iranian Mathematical Society • Open Mathematics • Resonance |
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D. CONFERENCE AND SEMINAR ORGANIZATION

- 2021 – present Co-organizer: ARCSIN Seminar, IISc–IIT Kanpur–IMSc.
- 2019 – present Organizer: Eigenfunctions Seminar, Indian Institute of Science.
- 2019 – present Co-organizer: APRG Seminar, Indian Institute of Science.
- 2018 – present Co-organizer: Algebra & Combinatorics Seminar, Indian Institute of Science.
- Nov 13–24, 2023 *Conference:* Algebraic and Combinatorial Methods in Representation Theory, ICTS Bangalore: Member of the Scientific Committee.
(Organizers: B. Ravinder, R. Venkatesh, S. Viswanath.)

D. CONFERENCE AND SEMINAR ORGANIZATION (cont.)

- Jun 20–24, 2022 *Conference:* Invited Mini-symposium on Distance matrices of graphs, with funding for an LAA Early Career speaker, International Linear Algebra Society (ILAS) Meeting, Galway.
Co-organizer: Projesh Nath Choudhury (Indian Institute of Science).
- Apr 30–May 1, 2022 *Symposium* on Combinatorics and Probability, Indian Statistical Institute Kolkata. (Co-organizer.)
- Sep 17–18, 2021 *Conference:* Joint Mathematics Symposium with IISER Pune (virtual).
Co-organizers: Chandrasheel Bhagwat and Tejas Kalelkar (IISER Pune) and Vamsi Pritham Pingali (Indian Institute of Science).
- Jul 29–30, 2021 *Conference:* Farewell Symposium for Dilip P. Patil, Indian Instt. of Science.
Co-organizers: Ravi A. Rao (NMIMS, Mumbai), Jugal K. Verma (IIT Bombay), Kriti Goel (IIT Gandhinagar), Shreedevi Masuti (IIT Dharwad), and R. Venkatesh (IISc Bangalore).
- Jul 16–20, 2018 *Conference:* 30th International Conference on Formal Power Series and Applications (FPSAC), supported by the NSF, Dartmouth College.
- Jul 24–28, 2017 *Conference:* Invited Mini-symposium on Linear Algebra and Positivity with Applications to Data Science, with funding for an LAA Early Career speaker, International Linear Algebra Society (ILAS) Meeting, Ames. Co-organizers: Dominique Guillot (U. Delaware) and Bala Rajaratnam (UC Davis).
- Jan 13, 2015 *Conference:* AMS Special Session on Positivity and Matrix Inequalities, AMS–MAA Joint Mathematics Meetings, San Antonio.
Co-organizers: Dominique Guillot and Bala Rajaratnam (Stanford).
- Jan 12, 2015 *Conference:* AMS Special Session on Limits of Discrete Structures, AMS–MAA Joint Mathematics Meetings, San Antonio. Co-organizers: Peter Diao, Dominique Guillot, and Bala Rajaratnam (Stanford).
- Oct 13–17, 2014 *Conference:* Workshop on “Positivity, graphical models, and modeling of complex multivariate dependencies” (sponsored by the AIM and NSF), American Institute of Mathematics. Co-organizers: Dominique Guillot and Bala Rajaratnam (Stanford) and Hélène Massam (York University).
- Feb 1–2, 2014 *Conference:* Lie Theory Workshop on Quantum Groups (supported by the NSF and Stanford), Stanford University.
Co-organizers: Daniel Bump and Persi Diaconis (Stanford).
- May 26–27, 2012 *Conference:* Young Researchers Meet (Mathematics and Computer Science), Stanford University.
Co-organizer: Govindan Rangarajan (Indian Institute of Science).
- Feb 4–5, 2012 *Conference:* Lie Theory Workshop on Quantum Groups (supported by the NSF and Stanford), Stanford University.
Co-organizers: Daniel Bump (Stanford) and Anne Schilling (UC Davis).
- 2009 Co-organized the Lie Theory Seminar at the Univ. of California at Riverside.
- 2001–02 Co-organized a weekly graduate student seminar, University of Chicago.

TEACHING AND MENTORING

A. MENTORING EXPERIENCE

Indian Institute of Science, Bangalore 2017 – present

- Advising: 3 Mathematics PhD students (2 graduated; 1 passed Comprehensive Exams).
- Mentor to 4 NBHM/NPDF/CV Raman Postdocs + 1 INSPIRE Faculty.

Stanford University, Stanford 2011 – 2017

Mentored graduate/undergraduate students at Stanford, including:

- Co-advised Mathematics PhD student at Stanford, with Bala Rajaratnam (2012 – 2016).
- Mentored Mathematics PhD student of Vyacheslav Futorny at Universidad de São Paulo (Spring–Summer 2016).
- Supervised MS student, in Independent Study in Probability (Spring 2014).

Yale University, New Haven 2009 – 2011

Mentored undergraduate Math Majors.

University of California at Riverside, Riverside 2006 – 2009

Mentored graduate students through and outside of the Lie Theory Seminar (and undergrads).

University of Chicago, Chicago 2000 – 2006

Directed Reading Program: Mentored undergraduate students on selected topics in:

- (a) elementary number theory (including Möbius functions on partially ordered sets), and
- (b) the Banach–Tarski Paradox and related topics.

B. GRADUATE TEACHING EXPERIENCE

Indian Institute of Science: Faculty in Mathematics 2017 – present

- *Math 212*: Algebra I
- *Math 219*: Linear Algebra
- *Math 220*: Representation theory of finite groups (co-taught with R. Venkatesh)
- *Math 221*: Analysis I: Real Analysis (co-taught with Gadadhar Misra)
- *Math 315*: Representation theory of Lie algebras (co-taught with R. Venkatesh)
- *Math 341*: Matrix Analysis and Positivity (**new course**: developed and taught at IISc)

Stanford University: Research Associate in Mathematics and Statistics 2011 – 2017

- *Stats 217*: Introduction to Stochastic Processes (multiple years)

University of California at Riverside: Visiting Assistant Professor (Math.) 2006 – 2009

- Fall 2008: Designed and taught a **mini-course**: Quivers, with a view toward Gabriel’s theorem

C. UNDERGRADUATE TEACHING EXPERIENCE

Indian Institute of Science: Faculty in Mathematics 2017 – present

UM102: Analysis and Linear Algebra II

Stanford University: Research Associate in Mathematics and Statistics 2011 – 2017

Math 16 (cross-listed as *Stats 90*): Mathematics and Statistics in the Real World

(developed and proposed at Stanford, co-taught with Bala Rajaratnam)

Stats 116: Theory of Probability (SCPD course with video streaming)

Book: Co-authored a Course Book (for Yale *Math. 107*) with Anna Lachowska: Aug 2015

Beautiful, Simple, Exact, Crazy: Mathematics in the Real World, Yale University Press.

Yale University: Lecturer in Mathematics 2009 – 2011
Math. 107: Mathematics in the Real World (**new course:** developed and taught at Yale)
Math. 115a: Integral Calculus
Math. 118: Introduction to Functions of Several Variables
Math. S120: Calculus – Several Variables (Summer Session)
Math. 120: Calculus – Several Variables (Special Section with Mathematica)
Math. 225a: Linear Algebra and Matrix Theory
Math. 370: Fields and Galois Theory

University of California at Riverside: Visiting Assistant Professor (Math.) 2006 – 2009
Math. 8B: Introduction to College Mathematics for Science
Math. 9B, 9C: First Year Calculus
Math. 10A, 10B: Calculus: Several Variables
Math. 23: Applied Matrix Algebra
Math. 46: Ordinary Differential Equations
Math. 132: Linear Algebra – II

University of Chicago, Lecturer in Mathematics: 2002 – 2006
Math. 151, 152, 153: Calculus – I, II, III
Math. 195, 196: Mathematical Methods for the Social Sciences – I, II

TALKS AT CONFERENCES/WORKSHOPS

Jan 4, 2023 AMS Joint Mathematics Meetings (Boston, USA): **ILAS Invited Address (Plenary)** (upcoming)

Dec 28, 2022 88th Annual Conference, Indian Mathematical Society (BIT Mesra, Ranchi): **Hansraj Gupta Memorial Award Lecture** (upcoming)

Dec 10, 2022 Indian Women and Mathematics (VNIT, Nagpur): Regional Workshop on Research and Opportunities (upcoming)

Oct 10, 2022 Karnataka State Higher Education Academy (KSHEA): Continuous Wholistic Training Program in Mathematics

Aug 24, 2022 Jain College Bangalore (with The Indian Mathematics Consortium): Faculty Development Programme on *Algebra, Geometry and Graph Theory: Emerging Interconnections*

Jul 21, 2022 International conference on ‘Formal Power Series and Algebraic Combinatorics’ (33rd FPSAC, *Satellite of ICM-2022*), Indian Institute of Science, Bangalore: **Invited (Plenary) talk**

Jun 22, 2022 International Linear Algebra Society (ILAS) Meeting, National University of Ireland, Galway: Mini-Symposium on General Preservers

May 18–21, 2022 Advanced Instructional School on Advanced Linear Algebra, Indian Statistical Institute at Bangalore

Apr 21, 2022 Kerala School of Mathematics: 2nd conference on **Recent advances in Mathematics and related areas**

Mar 17, 2022 Mathematisches Forschungsinstitut Oberwolfach: Workshop on The Laguerre–Pólya Class and Combinatorics

TALKS AT CONFERENCES/WORKSHOPS (cont.)

- Dec 17, 2021 International Conference on Linear Algebra and its Applications (ICLAA), Centre for Advanced Research in Applied Mathematics and Statistics (CARAMS), Manipal Academy of Higher Education (MAHE), Manipal
- Dec 7, 2021 4th BRICS Mathematics Conference, Indian Institute of Science Education and Research (IISER) Thiruvananthapuram: **Invited talk**
- Aug 5, 2021 36th Annual Conference, Ramanujan Mathematical Society (Amrita University, Coimbatore): **Invited talk (Semiplenary)**
- Jul 19, 2021 Applied Matrix Positivity, ICMS, Edinburgh, Scotland
- Jul 2021 8th **Asian Mathematical Conference** (Ha Long, Vietnam):
Special Section: Mathematical Analysis [*cancelled due to CoVid-19 pandemic*]
- Jul 2021 3rd Math Days in Sofia, Bulgarian Acad. Sci., Sofia, Bulgaria: Mini-Symposium on Hausdorff Geometry of Polynomials [*cancelled due to CoVid-19 pandemic*]
- Sep 23, 2020 TEQIP Course: Matrix Analysis and its Applications, Ambedkar National Institute of Technology (Jalandhar)
- Sep 18, 2020 UGC Course: Symmetry in Science and Engineering, Mumbai University
- Dec 16, 2019 Discussion Meeting in Representation Theory, Indian Institute of Science
- Nov 17, 2019 6th India Taiwan Conference on Discrete Mathematics, IIT-Varanasi (BHU)
- Oct 20, 2019 2nd Conference on Functional Analysis, Indian Institute of Technology (IIT) Bombay
- Sep 10, 2019 8th MAT TRIAD: International Conference on Matrix Analysis and its Applications, Liblice, Czech Republic: Special session on total positivity
- Jul 16, 2019 8th International Conference on Matrix Analysis and Applications (ICMAA), University of Nevada at Reno, USA
- Jul 9, 2019 International Linear Algebra Society (ILAS) Meeting, Rio de Janeiro, Brazil: **Plenary talk – LAMA Lecturer**
- Dec 19, 2018 Operator Theory and Operator Algebras (4th OTOA), Indian Statistical Institute at Bangalore
- Dec 7, 2018 Indian Academy of Sciences Discussion Meeting on Linear Analysis, Evolve Back (formerly Orange County Hotel), Coorg
- Dec 5, 2018 Algebras, Combinatorics, and Representation Theory, Indian Institute of Science Education and Research (IISER) Thiruvananthapuram
- Aug 27, 2018 **ICM Satellite Conference:** Algebras, Representations and Applications, Cusco, Peru
- Jun 8,9, 2018 Two motivating guest lectures, in the Training Program in Mathematics, National Institute of Science Education and Research (Bhubaneswar)
- Mar 8,10, 2018 Advanced Training in Mathematics Workshop, on Modern Aspects of Function Theory, Operator Theory, and Operator Algebras, Indian Statistical Institute at Bangalore

TALKS AT CONFERENCES/WORKSHOPS (cont.)

- Jan 9, 2018 3rd Indo–Russian Joint Conference in Statistics and Probability, Indian Institute of Science
- Oct 15, 2017 1st Conference on Functional Analysis, Indian Institute of Technology (IIT) Bombay
- Jul 28, 2017 2nd **Mathematical Congress of the Americas** (Montreal, QC):
Special Session on Representations of Lie Algebras
- Jul 24, 2017 International Linear Algebra Society (ILAS) Meeting, Iowa State University:
Mini-Symposium on Representation Theory
- Jan 4, 2017 AMS–MAA Joint Mathematics Meetings (Atlanta, GA): Special Session on
Gaussian Graphical Models and Combinatorial Algebraic Geometry
- Jan 6, 2016 AMS–MAA Joint Mathematics Meetings (Seattle, WA):
Special Session on Interactions between Noncommutative Algebra, Algebraic Ge-
ometry, and Representation Theory
- Oct 27, 2015 SIAM Conference on Applied Linear Algebra (Atlanta, GA):
Minisymposium on “Generalizations of Positive Matrices”
- Oct 3, 2015 AMS Central Fall Sectional Meeting (Loyola University, Chicago):
Special Session on Algebraic Statistics and its Interactions with Combinatorics,
Computation, and Network Science
- May 2, 2015 30th Bay Area Discrete (BAD) Math Day, Bay View Academy, Monterey, CA
- Jan 13, 2015 AMS–MAA Joint Mathematics Meetings (San Antonio, TX):
Special Session on Positivity and Matrix Inequalities
- Jan 12, 2015 AMS–MAA Joint Mathematics Meetings (San Antonio, TX):
Special Session on Limits of Discrete Structures
- Jan 10, 2015 AMS–MAA Joint Mathematics Meetings (San Antonio, TX):
Special Session on Algebraic Combinatorics and Representation Theory
- Oct 13, 2014 American Institute of Mathematics: Workshop on “Positivity, graphical models,
and modeling of complex multivariate dependencies”
- Sep 20, 2014 AMS Central Fall Section Meeting (University of Wisconsin at Eau Claire):
Special Session on Lie Algebras and Representation Theory
- Jun 7, 2013 International Linear Algebra Society (ILAS) Meeting (Providence, RI)
- May 16, 2010 Young Researchers Meet, Brown University
- Apr 11, 2010 AMS Spring Central Section Meeting (Macalester College, St. Paul):
Special Session on Hecke Algebras and Deformations in Geometry and Topology
- Nov 7, 2009 AMS Fall Western Section Meeting (University of California at Riverside):
Special Session on Representation Theory
- Jul 2, 2008 Institut Fourier at Grenoble: Graduate Student Seminar,
2008 Summer School on Geometric Methods in Representation Theory
- May 3, 2008 AMS Spring Western Section Meeting (Claremont McKenna College):
Special Session on Hopf Algebras and Quantum Groups

TALKS AT CONFERENCES/WORKSHOPS (cont.)

- Mar 29, 2008 AMS Spring Southeastern Section Meeting (Louisiana State University at Baton Rouge): Special Session on Geometric and Combinatorial Representation Theory
- May 9, 2007 Workshop on Representation Theory and Geometry, University of California at Berkeley
- Nov 4, 2006 AMS Fall Southeastern Section Meeting (University of Arkansas at Fayetteville): Special Session on Combinatorial Representation Theory
- May 27, 2006 Graduate Student Conference on Algebra And Representation Theory, Kansas State University at Manhattan

POSTER PRESENTATIONS

- Jul 17, 2018 International conference on ‘Formal Power Series and Algebraic Combinatorics’ (30th FPSAC), Dartmouth College, Hanover: Poster presentation (Session B)
- Jul 16, 2018 International conference on ‘Formal Power Series and Algebraic Combinatorics’ (30th FPSAC), Dartmouth College, Hanover: Poster presentation (Session A)
- Jul 4, 2016 International conference on ‘Formal Power Series and Algebraic Combinatorics’ (28th FPSAC), Vancouver, BC: Poster presentation

TALKS AT BIRTHDAY CONFERENCES

- Nov 26, 2022 Operator Theory and Complex Geometry (in honour of Gadadhar Misra’s 65th birthday), Indian Institute of Science Education and Research (IISER) Kolkata
- Dec 27, 2019 Conference on Linear Algebra and its Applications (in honour of Ravindra B. Bapat’s 65th birthday and retirement), Indian Statistical Institute at Delhi
- Dec 12, 2019 KBS Fest: Conference in honour of Kalyan B. Sinha’s 75th birthday, Indian Statistical Institute at Bangalore
- Jun 22, 2018 Analysis and Applications: Conference in honour of Sudhir H. Kulkarni’s 65th birthday, Indian Institute of Technology (IIT) Chennai
- Nov 30, 2017 Matrix and functional analysis: Conference in honour of Rajendra Bhatia’s 65th birthday, Ambedkar National Institute of Technology (Jalandhar)
- Oct 2, 2015 International Conference on Groups, Rings, Group Rings, and Hopf Algebras (celebrating the 75th birthday of Donald S. Passman), Loyola University, Chicago
- Dec 17, 2014 International Conference on “Infinite Dimensional Lie Theory and its Applications” (in honour of S. Eswara Rao’s 60th birthday), Harish-Chandra Research Institute, Allahabad
- May 19, 2005 Conference on “Lie Algebras, Vertex Operator Algebras and their Applications”: A conference in honor of Robert L. Wilson and James Lepowsky (on their 60th birthdays), North Carolina State University at Raleigh

COLLOQUIA, JOINT SEMINARS, ANNUAL DAY TALKS, ETC.

- Jul 8, 2022 Indian Academy of Sciences Mid-Year Meeting (IISc Bangalore):
Inaugural Fellows' Lecture
- Jan 5, 2022 Institute of Mathematics Research and Training (IMRT): 2nd K.S.S. Namboori-
pad Endowment Lecture
- Oct 29, 2021 National Institute of Science Education and Research (NISER) Bhubaneswar:
Colloquium
- Oct 20, 2021 Indian Institute of Technology (IIT) Gandhinagar: Mathematics Discipline Semi-
nar
- Feb 20, 2021 Indian Institute of Technology (IIT) Roorkee: Research Scholars' Day
- Jan 15, 2021 Indian Institute of Science Education and Research (IISER) Pune: Colloquium
- Sep 28, 2020 International Centre for Theoretical Sciences: ICTS monthly colloquium
- Feb 29, 2020 Indian Institute of Science Education and Research (IISER) Kolkata: Annual
Math-Stat Departmental Symposium
- Jan 29, 2020 Drexel University: Colloquium
- Oct 17, 2019 Delhi University: Colloquium
- Sep 20, 2019 Cochin University of Science and Technology (CUSAT): 20th Professor Wazir
Hasan Abdi Memorial Lecture
- Apr 17, 2019 Chennai Mathematical Institute: Colloquium
- Apr 4, 2019 Indian Institute of Technology (IIT) Kanpur: Math-Stat Colloquium
- Mar 12, 2019 TIFR Centre for Applicable Mathematics (CAM): Colloquium
- Nov 22, 2018 The Institute of Mathematical Sciences, Chennai: Colloquium (two hours)
- Jul 12, 2018 City University of New York: Joint NY Group Theory and NY Combinatorics
Seminar
- May 16, 2018 Indian Institute of Technology (IIT) Bombay: Colloquium
- May 16, 2018 International Mathematical Olympiad Training Camp (Homi Bhabha Centre for
Science Education, Mumbai): Valedictory Day Lecture
- May 10, 2018 Indian Statistical Institute at Bangalore: Colloquium
- Oct 17, 2017 Tata Institute of Fundamental Research: STCS Colloquium
- Apr 19, 2017 San Francisco State University:
Joint Algebra–Geometry–Combinatorics + Analysis Seminar
- Nov 27, 2013 Indian Statistical Institute at Bangalore: Colloquium
- Oct 18, 2013 DePaul University: Colloquium
- Apr 5, 2013 University of Toledo: Colloquium
- Feb 18, 2011 Iowa State University: Colloquium
- Sep 9, 2009 Institute of Mathematical Sciences (Chennai): Colloquium

SELECTED TALKS (other, after 2008)

- Jan 3, 2023 Northeastern University: Representation Theory and Related Topics (RTRT) Seminar
- Sep 30, 2022 Università degli Studi di Roma “Tor Vergata”, ARTS (Algebra and Representation Theory Seminar)
- Sep 26, 2022 Università degli Studi di Roma “La Sapienza”, Algebra and Geometry Seminar
- Sep 2, 2022 Azim Premji University: Weekly Science Seminar for students
- Aug 29, 2022 Cochin University of Science and Technology (CUSAT): Maths Seminar
- Aug 4, 2022 Unofficial Indian Math Olympiad Training Camp: Invited 90-minute talk
- May 20 and Jun 2,9, 2022 ARCSIN Seminar (Algebra, Representations, Combinatorics and Symmetric functions in INdia)
- May 9, 2022 University of Georgia at Athens: Algebra Seminar
- May 2, 2022 Ruhr Universität Bochum (Germany): Algebraic Lie Theory Seminar
- May 19, 2021 Simion Stoilow Institute of Mathematics of the Romanian Academy (IMAR): Operator theory seminar
- Mar 25, 2021 Universidad de São Paulo: LieJor online seminar
- Mar 3, 2021 Webinars on Operator Theory and Operator Algebras
- Feb 25, 2021 Indian Institute of Science Education and Research (IISER) Mohali: Analysis and Probability Seminar
- Feb 14, 2021 Chennai Mathematical Institute: STEMS Camp for high school students: Invited 90-minute talk
- Jan 20, 2021 Indian Statistical Institute at Delhi: Stat–Math Unit Seminar
- Dec 12, 2020 St. Berchmans College, Webinar series in Mathematics: Prof. M.T. Kurian Memorial Lecture
- Nov 18,25, 2020 Functional Analysis and Operator Theory Webinar
- Nov 20, 2020 Indian Institute of Technology (IIT) Kharagpur: Seminar on Graphs, Matrices and Applications
- Nov 12, 2020 Institute of Mathematical Sciences (Chennai): Algebraic Combinatorics Seminar
- Sep 10,24, 2020 Ashoka University / IIT-Gandhingar / JNU: Special Functions and Number Theory Seminar
- Feb 7, 2020 University of Delaware: Discrete Mathematics Seminar
- Feb 3, 2020 Temple University: Algebra Seminar
- Jan 31, 2020 City University of New York: Harmonic Analysis and PDEs Seminar
- Jan 29, 2020 University of Delaware: Inverse Problems and Analysis Seminar
- Jan 21, 2020 University of Pennsylvania: CAGE: Philadelphia Area Combinatorics and Algebraic Geometry Seminar
- Nov 6, 2019 Indian Institute of Science: 1st Math Symposium of Infosys Young Investigators

SELECTED TALKS (other, after 2008) (cont.)

- Oct 22, 2019 Tata Institute of Fundamental Research: STCS Seminar
- Jul 23, 2019 University of Maryland at College Park: Algebra–Number Theory Seminar
- Jul 19, 2019 City University of New York: New York Combinatorics Seminar
- Jul 18, 2019 Rutgers University: Lie Group/Quantum Mathematics Seminar
- Jun 3, 2019 Indian Statistical Institute at Bangalore, LIMIT Camp for high school students: Invited 90-minute talk
- Apr 17, 2019 Chennai Mathematical Institute: Seminar
- Apr 12, 2019 Indian Institute of Science: Eigenfunctions Seminar (with Gautam Bharali)
- Apr 5, 2019 Indian Institute of Technology (IIT) Kanpur: Seminar
- Mar 29, 2019 Tata Institute of Fundamental Research: Maths Seminar
- Sep 28, 2018 University of California at Los Angeles: Analysis and PDE Seminar
- Jul 13, 2018 Massachusetts Institute of Technology: Combinatorics Seminar
- Apr 6, 2018 University of Sydney: Algebra Seminar
- Apr 5, 2018 University of Sydney: Research Seminar
- Feb 2, 2018 Indian Institute of Science: Maths Seminar
- Jan 15, 2018 Indian Institute of Science: Eigenfunctions Seminar (with Siddhartha Gadgil)
- Dec 15, 2017 University of California at Los Angeles: Analysis and PDE Seminar
- Dec 7, 2017 University of California at Berkeley: Combinatorics Seminar
- Oct 16, 2017 Indian Institute of Science Education and Research (IISER) Pune: Two-hour Maths Seminar
- Aug 18, 2017 Indian Institute of Science: Eigenfunctions Seminar (two hours)
- May 18, 2017 University of California at Los Angeles: Combinatorics Seminar
- May 17, 2017 California Institute of Technology: Combinatorics Seminar
- May 4, 2017 Stanford University: Combinatorics Seminar
- Apr 28, 2017 City University of New York: Representation Theory Seminar
- Apr 28, 2017 City University of New York: New York Combinatorics Seminar
- Apr 24, 2017 Bronx Community College: Math Meeting
- Apr 18, 2017 Stanford University: Representation Theory Seminar
- Apr 17, 2017 Stanford University: Analysis/PDE Seminar
- Dec 8, 2016 Indian Institute of Science: Maths Seminar
- May 19, 2016 University of California at Santa Barbara, Algebra Seminar
- Nov 23, 2015 University of Pennsylvania: CAGE: Philadelphia Area Combinatorics and Algebraic Geometry Seminar
- Nov 20, 2015 Rutgers University, Lie Theory/Quantum Mathematics Seminar
- Nov 18, 2015 University of Delaware, Inverse Problems and Analysis Seminar

SELECTED TALKS (other, after 2008) (cont.)

- Oct 23, 2015 Northeastern University, Representation Theory and Related Topics (RTRT) Seminar
- Oct 21, 2015 University of Massachusetts at Amherst, Representation Theory Seminar
- Oct 20, 2015 Brandeis University, Combinatorics Seminar
- Oct 1, 2015 University of Chicago, Scientific and Statistical Computing Seminar
- Sep 30, 2015 DePaul University: Algebra, Combinatorics, and Number Theory Seminar
- Sep 28, 2015 University of Illinois at Chicago: Combinatorics Seminar
- Apr 22, 2015 San Francisco State University: Algebra-Geometry-Combinatorics Seminar
- Dec 15, 2014 Indian Institute of Technology (IIT), Mumbai: Algebraic Groups Seminar
- Nov 19, 2014 University of California at Berkeley: Representation Theory Special Seminar
- Sep 22, 2014 University of Wisconsin, Madison: Combinatorics Seminar
- Dec 10, 2013 Tata Institute of Fundamental Research: Maths Seminar
- Nov 28, 2013 Indian Institute of Science: Maths Seminar
- Oct 17, 2013 Loyola University: Algebra and Combinatorics Seminar
- Oct 16, 2013 University of Illinois at Chicago: Number Theory Seminar
- Oct 15, 2013 University of Illinois at Urbana-Champaign: Algebra-Geometry-Combinatorics Seminar
- Sep 3, 2013 University of Washington: Algebra and Algebraic Geometry Seminar
- Apr 4, 2013 University of Toledo: Algebra Seminar
- Jul 7, 2011 Indian Institute of Science Education and Research (IISER) Pune: Seminar
- Jun 28, 2011 Indian Statistical Institute at Delhi: Maths Seminar
- Nov 15, 2010 University of Michigan at Ann Arbor: Group theory, Number theory, and Representation theory seminar
- Oct 14, 2010 University of California at Riverside: Lie Theory Seminar
- Jan 8, 2010 Tata Institute of Fundamental Research: Maths Seminar
- Dec 7, 2009 University of Michigan at Ann Arbor: Group theory, Number theory, and Representation theory seminar
- Nov 20, 2009 Boston University: Special Geometry Seminar
- Nov 16, 2009 University of Massachusetts at Amherst: Representation Theory Seminar
- Nov 6, 2009 California Institute of Technology: Combinatorics and Lie Algebra Seminar
- Oct 12, 2009 Yale University: Geometry, Symmetry, and Physics Seminar
- Sep 10,11, 2009 Institute of Mathematical Sciences (Chennai): Algebra Seminar
- Sep 2, 2009 National Institute of Science Education and Research (NISER, Bhubaneswar, India): Special Seminar
- Mar 9, 2009 University of Southern California: Algebra Seminar
- Dec 18, 2008 Tata Institute of Fundamental Research: Maths Seminar

SELECTED TALKS (other, after 2008) (cont.)

- Dec 17, 2008 Indian Institute of Science: Maths Seminar
Nov 25, 2008 University of Chicago: Representation Theory Seminar
Nov 24, 2008 University of Illinois at Chicago: Algebra Seminar
Oct 23, 2008 University of California at Riverside: Lie Theory Seminar
Sep 4, 2008 Rutgers University: Algebra Seminar
Sep 3, 2008 Yale University: Algebra and Lie Groups Seminar
Aug 29, 2008 Cornell University: Lie Groups Seminar
Jul 21, 2008 DePaul University: Algebra Seminar
Apr 4, 2008 University of California at Riverside: Commutative Algebra Seminar