

## **Summary of contributions of Prof. Ajay Kumar**

Dr. Ajay Kumar is presently NASI Senior Scientist and was working as Professor in Department of Mathematics, University of Delhi. He did his M.Sc. and Ph.D. in Mathematics from University of Delhi.

His research majorly focuses on Harmonic Analysis; Representations of locally compact groups; Potential theory of Stratified Lie groups; Nilpotent Lie groups;  $C^*$ -algebras; Operator Spaces; Operator systems and complex analytic methods in partial differential equations. He has published 80 research papers in International journals such as Transactions of American Mathematical Society, Journal of Functional Analysis, Potential Analysis, Math. Cambridge Philosophical Society, Mathematische Zeitschrift, Journal of Geometric Analysis, Pacific Journal of Mathematics, Proceedings American Math. Soc, Proceeding Edinburgh Math. Society, Applicable Analysis, Forum Mathematicum, Positivity, Archiv der Mathematik, Complex Variables and Elliptic Systems, Boundary Value Problems, Journal of Inequalities and Applications etc. His international collaborators include E. Kaniuth, W. Hauenschild, S. Echterhoff, H. Begehr, D. Schersau, Germany; A. M. Sinclair, U.K.; O. Gebuhrer, France; T. Itoh, Japan; J. Vanegas, Venezuela. He has supervised 20 Ph.D. theses and 19 M. Phil. dissertations in University of Delhi.

Dr. Ajay Kumar is a Fellow of National Academy of Sciences and is also recipient of NASI Senior Scientist Platinum Jubilee Fellowship. He has received 12 international research fellowships such as DAAD (German Academic Exchange Service), Commonwealth Staff fellowship, CIES French fellowship, Royal Society London Fellowship, JSPS Japanese Fellowship, DFG (German Research Foundation), Post Doctoral Fellowships of German Universities etc. He has been referee/reviewer for several national and international journals like Proceeding London Math. Society, Mathematische Nachrichten, Studia Math. Complex variables and Elliptic equations, Journal of Operator Theory and complex analysis, Mathematical Reviews, Zentralblatt fur Mathematik etc.

He has delivered more than 100 invited talks in 40 different universities/institutes such as University of Paderborn, Oberwalfach Institute, Freie Universitat Berlin, Germany; University of Nancy, University of Strasbourg, France; International Centre of Theoretical Physics, Trieste, Italy; University of Edinburgh, U.K.; University of Tokyo, Gunma University, Chiba University, Japan; University of Belfast, Ireland; Tata Institute of Fundamental Research, Mumbai; Indian Statistical Institute, Delhi and Bangalore; Indian Institute of Technology, Kanpur; Indian Institute of Sciences, Bangalore; Panjab University etc.

Dr. Ajay Kumar was the Sectional President, Indian Science Congress 2014-15, council member of Indian Mathematical Society 2014-17 and is presently a Fellow of International Society of Analysis and Applications, New York along with being member of various other international and national mathematical societies.

He has been teaching at University of Delhi since 43 years along with serving at various positions like Dean Research, University of Delhi, Dean Research (PS & MS); Dean, Faculty of Mathematical Sciences; Head, Department of Mathematics; Chairman, Board of Research Studies in Mathematical Sciences; Programme Coordinator, Cluster Innovation Centre etc.

## Curriculum Vitae

### **Prof. Ajay Kumar, Ph.D., FNASc.**

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### **Educational Qualifications**

1. Ph.D., Mathematics, 1980, University of Delhi, Thesis entitled “Spectral Synthesis in hypergroups”
2. M.Sc., Mathematics, 1976, University of Delhi, Second position in the University.
3. B.Sc. (Hons.) Mathematics, 1974, University of Delhi
4. Proficiency in German Language, Studied at Goethe Institute, Rothenberg ob der Tauber, Germany, 1981.
5. Proficiency in French Language, Studied at University of Strasbourg, France, 1987.

### **Positions held**

1. Dean Faculty of Mathematical Sciences, Dec 21, 2012-Aug 2, 2013

2. Head, Department of Mathematics, Dec 21, 2012- Dec 20, 2015.
3. Dean Research, University of Delhi, Jan 24, 2011- Jul 3, 2012.
4. Dean Research (Physical and Mathematical Sciences), University of Delhi, Jul 4, 2012- Nov 25, 2016.
5. Programme Coordinator/Director, Cluster Innovation Centre, University of Delhi, Sept 2011- Jan 2012.
6. Chairman, Board of Research Studies Mathematical Sciences University of Delhi, Dec 21, 2012-Aug 2, 2013.
7. Professor, Department of Mathematics, University of Delhi, Delhi, India Sept, 2004- June 2020.
8. Postdoctoral fellow / Guest Professor in several Universities in Germany, France, U.K.
9. Reader, Department of Mathematics, Rajdhani College (University of Delhi) from 1987-2004.
10. Lecturer, Department of Mathematics, Rajdhani College (University of Delhi) from 1977-1987.

### **Fellow**

1. Elected Fellow of National Academy of Sciences, India, 2017.
2. NASI Senior Scientist Platinum Jubilee Fellow, 2021.

### **Fellowships and Research grants awarded**

1. DAAD (German Academic Exchange Service) Post-doctoral fellow at University of Paderborn, Germany, 1981-1983.
2. C.I.E.S. (French Govt. Fellowship) Post-doctoral fellow at University of Strasbourg, France, 1987-88.
3. Post-doctoral Fellow (Wissenschaftlicher Mitarbeiter) at Fachbereich Mathematik, University of Paderborn, Germany, 1989.
4. DAAD (German Academic Exchange Service) Re-invitation fellowship at Freie Universitat, Berlin, Germany, 1992.

5. Post-doctoral Fellow of Freie Universitat Fachbereich Mathematik, Freie Universitat, Berlin, Germany, 1992.
6. Commonwealth Academic Staff Fellowship at University of Edinburgh, U.K, 1995-96.
7. DAAD (German Academic Exchange Service) Re-invitation fellowship at Fachbereich Mathematik, University of Paderborn, Germany, 1999.
8. Royal Society, London fellowship collaboration with Indian National Science Academy at University of Edinburgh, U.K., 2000.
9. DAAD (German Academic Exchange Service) Re-invitation fellowship at Freie Universitat, Berlin, Germany, 2003.
10. DFG (German Research Foundation) collaboration with Indian National Science Academy at Freie Universitat, Berlin, Germany. 2004.
11. DFG (German Research Foundation) collaboration with Indian National Science Academy at Freie Universitat, Berlin, Germany. 2008.
12. JSPS (Japan Society for Promotion of Science) collaboration with Indian National Science Academy at Gunma University, Japan, 2012.

Several other research grants from University Grants Commission, Council of Scientific Research and University of Delhi.

**Research Experience:** 1976-todate, i.e., 45 years

**Specializations:** Operator Spaces, Harmonic Analysis, Representation theory of locally compact groups and hypergroups, Complex analytic methods in partial differential equations, Potential Theory on Lie groups.

**Research Publications in journal of International repute namely (Total no. 80)**

**Publications of Ajay Kumar**

1. Ajit Kaur Chilana and Ajay Kumar, (1979) Spectral synthesis in Segal algebras on hypergroups. Pacific Journal of Mathematics 80,59-76(USA) ISSN 0030-8730 Mathematical Reviews 80g:430011 Zentralblatt fur Mathematik 371.43012(402.43004).
2. Ajit Kaur Chilana and Ajay Kumar, (1979) Ultra strong Ditkin sets in hypergroups. Proc. Amer. Math. Soc. 77,353-358(USA) ISSN 0002-9939 Mathematical Reviews 80g: 43012 Zentralblatt fur Mathematik 388.43006(414.43005).
3. Ajay Kumar and Ajit Iqbal Singh, (1981) Spectral synthesis in product and quotients of hypergroups. Pacific Journal of Mathematics 94,177-194(USA) ISSN 0030-8730 ISSN 0030-8730 Mathematical Reviews 82h:43005 Zentralblatt fur Mathematik 415.43010(458.43010),
4. Wilfried Hauenschild, Eberhard Kaniuth and Ajay Kumar, (1983) Ideal structure of Beurling algebras on  $[FC]^-$  groups. Journal of Functional Analysis 51,213-228(USA) ISSN 0022-1236. Mathematical Reviews 84m: 22007 Zentralblatt fur Mathematik 529.43005.
5. Wilfried Hauenschild, Eberhard Kaniuth and Ajay Kumar, (1984) Harmonic analysis on central hypergroups and induced representations. Pacific Journal of Mathematics 110,83-112(USA) ISSN 0030-8730 ISSN 0030-8730 Mathematical Reviews 85g:43015 Zentralblatt fur Mathematik 476.43007(528.43005).
6. Ajay Kumar, (1986) Beurling algebras and structure of locally compact groups, Modern Analysis and its applications. Prentice Hall of India, 229-240(India) ISBN -0-87692-439-9 ISBN -0-87692-439-9 Mathematical Reviews 89d: 22008 Zentralblatt fur Mathematik 667.43003.
7. Ajay Kumar and Ajit Iqbal Singh, (1988) Counter examples in spectral synthesis on hypergroups. Rendiconti di Math. 8,147-155(Italy), ISSN 1120-7183 Mathematical Reviews 91i:43004 Zentralblatt fur Mathematik 707.43003.

8. Ajay Kumar and Ajit Iqbal Singh, (1989) A dichotomy theorem for random walks on hypergroups. Lecture Notes in Mathematics, Springer Verlag 1379,179-184 (Germany) , ISBN: 978-3-540-51401-5. Mathematical Reviews 90i:43004 Zentralblatt fur Mathematik 669.60017.
9. Oliver Gebuhrer and Ajay Kumar, (1989) Wiener property for a class of discrete hypergroups. Mathematische Zeitschrift 202,271-274 (Germany) ISSN 0025-5874Mathematical Reviews 90i:43004 Zentralblatt fur Mathematik 672.43004.
10. Siegfried Echterhoff, Eberhard Kaniuth and Ajay Kumar, (1991) Qualitative uncertainty principle for locally compact groups. Forum Mathematicum 3, 355-369(Germany) ISSN 1435-5337.ISSN 1435-5337.Mathematical Reviews 98a:43005 Zentralblatt fur Mathematik 725.43006.
11. Ajay Kumar, (1992) Qualitative uncertainty principle for hypergroups. Lecture Notes in Mathematics, Springer Verlag 1511, 1-9(Germany) ISBN 3-540-55365-7Mathematical Reviews 94a:43012 Zentralblatt fur Mathematik 781.43003 .
12. Heinrich Begehr and Ajay Kumar, (1994) Bi-analytic functions of several complex variables. Complex Variables, Theory and Applications 24,89-106(USA) ISSN 1747-6933 ISSN 1747-6933 Mathematical Reviews 95k:32008 Zentralblatt fur Mathematik 794.32005
13. Ajay Kumar, (1994) A generalized Riemann boundary problem in two variables. Arch. Math. 62,531-538 (Germany) ISSN0003-889X Mathematical Reviews 95g:32995 Zentralblatt fur Mathematik 803.32001,
14. Ajay Kumar, (1994) Riemann Hilbert problem for a class of nth order systems. Complex Variables, Theory and Applications 25,11-22(USA) ISSN 1747-6933Mathematical Reviews 95k:30100 Zentralblatt fur Mathematik 804.30036
15. Ajay Kumar and Allan M. Sinclair, (1998) Equivalence of norms on operator space tensor product of C\*-algebras. Transactions of American Mathematical Society 350,

2033-2048 (USA) ISSN 0002-9947 Mathematical Reviews 99a:46103 Zentralblatt fur  
Mathematik 906.46043.

16. Ajay Kumar, (2001) Qualitative uncertainty principle for certain hypergroups. Glasnik  
Mathematicki 36, 33-38 (Crotia), ISSN 0017-095X Mathematical Reviews 2002h:43006  
Zentralblatt fur Mathematik 982.43005.
17. Ajay Kumar, (2001) Operator space projective tensor product of  $C^*$ -algebras.  
Mathematische Zeitschrift 237,211-217 (Germany) ISSN 0025-5874 ISSN 0025-5874  
Mathematical Reviews 2002c:46114 Zentralblatt fur Mathematik 1035.46040.
18. Ajay Kumar, (2001) Involution and the Haagerup tensor product, Proc. Edinburgh Math.  
Soc. 44,317-322 (U.K.) , ISSN 0013-0915 Mathematical Reviews 2002c:46066  
Zentralblatt fur Mathematik 1011.46051.
19. Eberhard Kaniuth and Ajay Kumar, (2001) Hardy's Theorem for simply connected  
Nilpotent Lie groups. Math. Proc. Cambridge Phil. Soc. 131,487-494 (U.K.) ISSN 0305-  
0041. ISSN 0305-0041. Mathematical Reviews 2002c:22007 Zentralblatt fur Mathematik  
996.43004.
20. Ajay Kumar and Chet Raj Bhatta, (2003) Uniform version of Wiener Tauberian theorem,  
Journal of Mathematical Sciences 2,63-71 (India) Mathematical Reviews 2005h:43006  
Zentralblatt fur Mathematik 1079.43006.
21. Ajay Kumar and Chet Raj Bhatta, (2004) An Uncertainty Principle like Hardy's theorem  
for nilpotent Lie groups. Journal of Australian Math.Soc. 77,47-53 (Australia) ISSN  
1446-7887. Mathematical Reviews 2005f:43005 Zentralblatt fur Mathematik 1066.22006.
22. Ajay Kumar and Ravi Prakash, (2005) Boundary value problems for Poisson equation  
and bi-analytic functions, Complex Variables, Theory and Applications 50,597-608  
(U.S.A.) ISSN 0278-1077 Mathematical Reviews 2006c:30056 Zentralblatt fur  
Mathematik 1188.30058.
23. Heinrich Begehr and Ajay Kumar, (2005) Boundary value problems for higher order  
inhomogeneous equations I, Analysis, International Mathematical journal of Analysis and



its applications, 25,55-71(Germany) ISSN 2196-6753.Mathematical Reviews  
2006d:30067 Zentralblatt fur Mathematik 1077.30.

24. Heinrich Begehr, Ajay Kumar, Dieter Schmersau and Judith C.Vanegas,(2005) Mixed complex boundary value problems in complex analysis, Intern. Conf. On Finite or Infinite Dimensional Complex Analysis and Applications. Eds. H. Kazama, M. Morimoto, C.C. Yang. Kyushu Univ. Press, Fukuoka, 25-40. ISBN 4-87378-899-4 ISBN 4-87378-899-4 Mathematical Reviews 2359680, Zentralblatt fur Mathematik 1129.30317.
25. Ajay Kumar and Ravi Prakash, (2006) Mixed boundary value problems for higher order inhomogeneous equations, Complex Variables and Elliptic Equations 51,209-223 (USA), ISSN 1747-6933 Mathematical Reviews 2006j:30086 Zentralblatt fur Mathematik 1092.30056 .
26. Heinrich Begehr and Ajay Kumar, (2006) Boundary value problems for bi-polyanalytic functions, Applicable Analysis 85,1045-1077 (USA), ISSN 0003-6811 Mathematical Reviews 2007f:30073 Zentralblatt fur Mathematik 1105.30032.
27. Heinrich Begehr and Ajay Kumar, (2007) Boundary value problems for higher order inhomogeneous equations II, Analysis, International Mathematical journal of Analysis and its applications, 27, 359-373 (Germany) ISSN 2196-6753 Mathematical Reviews 2373661, Zentralblatt fur Mathematik 1137.30010.
28. Ajay Kumar and Ravi Prakash, (2007) Iterated Boundary Value Problems for the inhomogeneous Polyanalytic equation, Complex Variables and Elliptic Equations 52,921-932 (USA) ISSN 1747-6933Mathematical Reviews 2374962(2008m:30050) Zentralblatt fur Mathematik 1146.30031.
29. Ajay Kumar, (2007) Operator space structure of Banach Spaces, Math. Student 76,239-248 (India). ISSN 0019-5839 ISSN 0019-5839 Mathematical Reviews 2522941 Zentralblatt fur Mathematik 1194.46079 Zentralblatt fur Mathematik 1194.46079.

30. Ajay Kumar and Ravi Prakash, (2008) Neumann and Mixed boundary value problem, Journal of Applied Functional Analysis 3, 399- 417 (USA). , ISSN 1559-1948  
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31. Ajay Kumar and Ravi Prakash, (2008) Dirichlet problem for Inhomogeneous Polyharmonic equation, Complex Variables and Elliptic Equations 53, 643-651 (USA).  
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32. Ranjana Jain and Ajay Kumar, (2008) Operator space tensor product of C\*-algebras, Mathematische Zeitschrift 260, 805-811 (Germany). ISSN 0025-5874. Mathematical Reviews 2443331(2009i:46098) Zentralblatt fur Mathematik 1165.46030.
33. Ajay Kumar and Mukund Madhav Mishra, (2008) Polyharmonic Dirichlet problem on the Heisenberg group. Complex Variables and Elliptic Equations 53, 1103-1110. (USA).  
ISSN 1747-6933. Mathematical Reviews 2467385 (2009m: 35058) Zentralblatt fur Mathematik 1177.22005.
34. Arun Chaudhary and Ajay Kumar, (2009) Boundary value problems in the upper half plane. Complex Variables and Elliptic Equations 54(5), 441-448 (USA). ISSN 1747-6933. Mathematical Reviews 2524139 (2010d: 30054) Zentralblatt fur Mathematik 1166.30021.
35. Ajay Kumar and Ravi Prakash, (2009) Mixed boundary value problem for inhomogeneous Poly-analytic-harmonic equation, More Progress in Analysis- Proceedings of the 5th International ISAAC Congress, Catania Eds. H. Begehr, F. Niolosi, World Scientific, Singapore, 1149-1161. ISBN-10 981-283-562-8. Zentralblatt fur Mathematik 1183.30041.
36. Heinrich Begehr, Arun Chaudhary and Ajay Kumar, (2010) Bi-polyanalytic functions in the upper half plane. Complex Variables and Elliptic Equations 55,305-316 (USA). ISSN 1747-6933. Mathematical Reviews 2011e; 30111 Zentralblatt fur Mathematik 1188.30057.

37. Arun Chaudhary and Ajay Kumar, (2010) Mixed Boundary value problems in the upper half plane. *Journal of Applied Functional Analysis* 5, 209-220. ISSN 1559-1948. *Mathematical Reviews* 2675595 (2011g:30102). *Zentralblatt fur Mathematik* 1238.30035.
38. Ajay Kumar and Mukund Madhav Mishra, (2010) Green's functions on the Heisenberg Group. *Analysis, International Mathematical journal of Analysis and its applications* 30,147-155. ISSN 2196-6753. *Mathematical Reviews* 2604184(2011d; 22008 f) *Zentralblatt fur Mathematik* 1197.22005.
39. Ranjana Jain and Ajay Kumar,(2011) Ideals in operator space projective tensor product of  $C^*$ -algebras, *J. Aust. Math. Soc.* 91, 275-288. ISSN 1446-7887. Also available <http://arxiv.org/abs/1106.3143>. *Mathematical Reviews* 2861849 *Zentralblatt fur Mathematik* 1235.46050.
40. Ranjana Jain and Ajay Kumar (2011), Projective tensor product, *Proc. Of 21 Annual conference Jammu Mathematical Society.* 27-40. ISBN 978-81-910015-1-8.
41. Ajay Kumar and Vandana Rajpal (2012) "Symmetry and quasi-centrality of operator space projective tensor product" *Archiv der Mathematik.* 99, 519–529. ISSN: 0926-2601 (Print) 1572-929X (Online). Available also on <http://arxiv.org/abs/1205.1679>. *Mathematical Reviews* 3001555. *Zentralblatt fur Mathematik* 1266.46044.
42. Ajay Kumar and Mukund Madhav Mishra (2013), Green functions and related boundary value problems on the Heisenberg group. *Complex Variables and Elliptic Equations* 58, 547-556. ISSN 1747-6933. Available online DOI:10.1080/17476933.2012.693482. *Mathematical Reviews* 3038746. *Zentralblatt fur Mathematik* 1268.22008.
43. Ajay Kumar and Mukund Madhav Mishra (2013), Powers of sub-Laplacian on step two nilpotent Lie groups. *Journal of Geometric Analysis* 23, 1559-1570. ISSN 1050-6926. Available online DOI 10.1007/s12220-012-9298-0. *Mathematical Reviews* 3078364. *Zentralblatt fur Mathematik* 1280.22014.
44. Ranjana Jain and Ajay Kumar, (2013) Spectral Synthesis for the Operator space projective tensor product of  $C^*$ -algebras". *Bulletin of the Malaysian Mathematical*

Sciences Society 36,855-864 . ISSN 0126-6705. Also available on <http://arxiv.org/abs/1108.3208>. Mathematical Reviews 3108780. Zentralblatt fur Mathematik 1286.46062.

45. Ranjana Jain and Ajay kumar, (2014) Operator space tensor product of C\*-algebras: Embedding into second dual and ideal structure, Proc. Edinburgh Math. Soc.57.505-519 ISSN 0013-0915. Available on arXiv: 1106.2644v. Available online DOI: <http://dx.doi.org/10.1017/S001309151300045X>. Mathematical Reviews 3200321 Zentralblatt fur Mathematik 1303.46042.
46. Ajay Kumar and Vandana Rajpal,(2014) -Regularity of Operator Space Projective Tensor Product of C\*-Algebras” Journal of Applied Functional Analysis 9, 70-80. ISSN 1559-1948. Also available on <http://arxiv.org/abs/1112.0444>. Mathematical Reviews 3183838 Zentralblatt fur Mathematik 1367.46046.
47. Ajay Kumar, (2014) From Fourier series to Harmonic analysis on locally compact groups, Math. Student 83, 87-107 ISSN 0019-5839. Mathematical Reviews 3310043.
48. Ajay Kumar and Vandana Rajpal, (2014)“ Projective tensor product of C\*-algebras” Advances in Pure Mathematics 4, 176-188. ISSN 2160-0368. Also available on <http://arxiv.org/abs/1305.0791>.
49. Mukund Madhav Mishra, Ajay Kumar and Shivani Dubey (2014) “Green's function for certain domains in the Heisenberg Group  $H_n$  “Boundary Value Problems 2014, 2014:182 ISSN 1687-27770. Also available on <http://arxiv.org/abs/1308.5643>. Published online <http://www.boundaryvalueproblems.com/content/2014/1/182>. Mathematical Reviews 3286109. Zentralblatt fur Mathematik 1304.22008.
50. Ashish Bansal, Ajay Kumar (2015) “Generalized analogs of the Heisenberg uncertainty inequality” *Journal of Inequalities and Applications* 2015:168, 1-15. ISSN 1029-242X. DOI 10.1186/s13660-015-0691-7R <http://arxiv.org/abs/1410.3050> Mathematical Reviews 3351169. Zentralblatt fur Mathematik 0651531.

51. Shivani Dubey, Ajay Kumar and Mukund Madhav Mishra,(2015) "Green's function for a slice of the Koranyi ball in the Heisenberg Group  $H_n$ ," International Journal of Mathematics and Mathematical Sciences. Volume 2015, Article ID 460461, 7 pages <http://dx.doi.org/10.1155/2015/460461>, ISSN 0161-1712. Mathematical Reviews 3413058.
  
52. Vandana Rajpal, Ajay Kumar and Takashi Itoh, (2015) "Schur tensor product of operator spaces" Forum Mathematicum 27, 3635 – 3655 DOI 10.1515/forum-2013-0142 Available on <http://arxiv.org/abs/1308.4538>. ISSN 1435-5337 Mathematical Reviews 3420353, Zentralblatt fur Mathematik 06505814.
  
53. Ashish Bansal, Ajay Kumar (2016) "*Heisenberg Uncertainty Inequality for Gabor Transform*" Journal of Mathematical Inequalities 10, 737-749 ISSN: 1846-579X (print), 1848-9575 (online) Available on <http://arxiv.org/abs/1507.00446> and online at <http://jmi.ele-math.com/forthcoming> . Mathematical Reviews 3565149 Zentralblatt fur Mathematik 06649793.
  
54. Shivani Dubey, Ajay Kumar and Mukund Madhav Mishra, (2016) Neumann boundary value problem in domains of the Heisenberg Group  $H_n$  Potential Analysis 45, 119-133. ISSN: 0926-2601 (Print) 1572-929X (Online) Published online <http://dx.doi.org/10.1007/s11118-016-9538-1> Also available on <http://arxiv.org/abs/1411.6838> Mathematical Reviews 3511807. Zentralblatt fur Mathematik 06598966.
  
55. Ajay Kumar and Vandana Rajpal (2016), "Arens regularity of projective tensor products" Archiv der Mathematik 107, 531-541. ISSN: 0003-889X (Print) 1420-8938 (Online) ISSN: 0003-889X (Print) 1420-8938 (Online) Available on arxiv: 1305.0791v1 [math.OA]. Published online DOI: 10.1007/s00013-016-0942-y Mathematical Reviews 3562381 Zentralblatt fur Mathematik 06668330.
  
56. Ashish Bansal, Ajay Kumar" (2017) Qualitative Uncertainty Principle for Gabor transform" Bulletin Korean Mathematical Society 54, 71-84. pISSN: 1015-8634 /

eISSN: 2234-3016. Available also on <http://arxiv.org/abs/1508.05475> Mathematical Reviews 3614563 Zentralblatt fur Mathematik 06699727.

57. Shivani Dubey, Ajay Kumar and Mukund Madhav Mishra (2017), Polyharmonic Neumann and mixed boundary value problems in the Heisenberg group  $H_n$ . Complex Variables and Elliptic Equations 62, no.10, 1506-1518. ISSN: 1747-6933 (Print) 1747-6941 (Online) DOI: 10.1080/17476933.2016.1278439. Available on <http://arxiv.org/abs/1511.00079>. Mathematical Reviews 3677950, Zentralblatt fur Mathematik 06774297.
58. Preeti Luthra and Ajay Kumar (2017), Embeddings and  $C^*$ -envelopes of exact operator systems. Bull.Aust.Math.Soc. 96, issue 2, 274-285. ISSN: 0004-9727 (Print), 1755-1633 (Online) DOI: <https://doi.org/10.1017/S0004972717000284> Available on <http://arxiv.org/abs/1603.01491> Mathematical Reviews 3703909, Zentralblatt fur Mathematik 06792044.
59. Jyoti Sharma and Ajay Kumar (2017), “Qualitative uncertainty principle for Gabor transform on certain locally compact groups” Advances in Pure and Applied Mathematics- De Gruyter 9, 205-220. Online published on DOI: <https://doi.org/10.1515/apam-2017-0050> Mathematical Reviews 3819539 Zentralblatt fur Mathematik 1394.43003.
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65. Vibha Madaan, Ajay kumar and V.Ravichandran (2019)" Lemniscate convexity and other properties of generalized Bessel functions" *Studia Scientiarum Mathematicarum Hungarica.* 56(4), 404-419. Mathematical Reviews 4048763. Zentralblatt fur Mathematik 07153042.
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68. Priyanka Kumari, Ajay Kumar and P.Trisandhaya (2021)" Calibration Estimators for Quantitative Sensitive Mean Estimation Under Successive Sampling" *Communications in Statistics – Theory and Methods* 50 (6), 1341-1361. <https://doi.org/10.1080/03610926.2019.1649430>. Mathematical Reviews 4217713
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<https://doi.org/10.1007/s43036-021-00133-6>. Mathematical Reviews 4234252, Zentralblatt fur Mathematik 07348549
73. Vibha Madaan, Ajay kumar and V.Ravichandran (2021) “Estimates for initial coefficients of certain Bi-univalent functions” Filomat, 35(6),1993-2009. Mathematical Reviews 43644050 <https://doi.org/10.2298/FIL2106993M>.
74. Janson Antony and Ajay Kumar ( 2021) “Spectra of elements in operator space tensor products of  $C^*$ -algebras” Positivity 25(5),1973-1987. <https://doi.org/10.1007/s11117-021-00856-z>. Mathematical Reviews 4338555. Zentralblatt fur Mathematik 07437483.
75. Surbhi Beniwal, Ajay Kumar and Preeti Luthra ( 2022) "Quantized Hilbert modules over local operator algebras and Hyperrigidity of local operator systems" Annals of Functional Analysis 13(1). <https://doi.org/10.1007/s43034-021-00146-5>. Mathematical Reviews 4333775, Zentralblatt fur Mathematik 07428143.
76. Ajay Kumar and Preeti Luthra ( 2022) “ Operator System Theory: A Survey” In Mathematics , its Applications and History (ed. S.G. Dani), Narosa, India.8.1-8.20.



77. Piyush Bansal, Ajay Kumar and Ashish Bansal (2022) “ Continuous Modulated Shearlet Transform” To appear in Advances in Pure and Applied Mathematics. Online available <https://www.openscience.fr/Forthcoming-papers>.
78. Jyoti Sharma and Ajay Kumar (2022) “ Uncertainty principles on nilpotent groups” To appear in Khayyam Journal of Mathematics.
79. Surbhi Beniwal, Ajay Kumar and Preeti Luthra ( 2022) “ Local version of approximation theorem and of  $\lambda$ - tensor product of operator systems” Advances in Operator Theory **7**, 35. <https://doi.org/10.1007/s43036-022-00200-6>. Mathematical Reviews 4431296
80. Arpit Kansal, Ajay kumar and Vandana Rajpal (2022) “Inductive limit in the category of  $C^*$ -ternary rings” To appear in Bulletin Korean Mathematical Society.

**Total Citations – 633. Research work has been referred/cited 28 times in books, 140 international journals, 153 authors and many Ph.D.thesis**

<b>Citation indices</b>	<b>All</b>	<b>Since 2017</b>
Citations	633	181
h-index	14	7
i10-index	22	1

Citations on MATHSCINET – 241 by 153 authors

### **Research guidance**

Supervised 20 Ph.D. theses and 19 M.Phil. dissertations.

### **Supervision of Doctoral Thesis**

1. Bhatta, Chet Raj, 2005, Behaviour of functions and their Fourier transforms.
2. Prakash, Ravi, 2007, Boundary value problems in complex analysis.
3. Gupta, Nisha, 2009, A study of Banach frames and related concepts in Banach spaces.
4. Chaudhary, Arun, 2010, Complex Boundary value problems in unbounded regions.
5. Mishra, Mukund Madhav, 2011 Potential theory of Stratified Lie groups.
6. Jain, Ranjana, 2012 Operator space tensor product of C\*-algebras and their ideal structure.
7. Rajpal, Vandana, 2014, Projective Norms on tensor products of operator spaces.
8. Nagpal, Sumit, 2014, First and Second Order Differential Subordinations and Radius Problems for Caratheodary Functions.
9. Jain, Sandhaya, 2015, Weighted function spaces of Lebesgue type.
10. Kumar, Ravinder, 2016, Efficient Numerical Algorithms for quasi-linear elliptic and hyperbolic partial differential equations.
11. Dubey, Shivani, 2017, Boundary value problems for the Kohn-Laplacian on the Heisenberg group  $H_n$ .
12. Bansal, Ashish, 2017, Heisenberg Inequality and Uncertainty Principle on locally compact groups.
13. Singh, Monika, 2017, Function Spaces of Lebesgue Type and Weighted Norm Inequalities.
14. Preeti, 2017, C\*-envelopes and Tensor Products of Operator Systems.
15. Verma, Shelly, 2018, Coefficient and radius estimates of normalized analytic functions.
16. Kumari Santosh, 2018, Weighted norm inequalities involving integral operators.
17. Sharma Jyoti, 2019, Uncertainty principles on locally compact groups.
18. Janson, Antony A, 2020, Tensor products of operator spaces; their inductive and projective limits .
19. Vibha, 2021, Starlikeness and Convexity of Certain Univalent and Entire Functions.
20. Trisandhya, Pidugu, 2022, Design and Analysis of Sensitive Characteristics on Successive Occasions and its Applications.

### **Supervision of M.Phil dissertations**

1. Verma, Anita, 1999, The Grothendieck inequality.

2. Batra Rakesh, 2005, Uncertainty principle on locally compact groups.
3. Vaid Ruchika, 2005, Higher order Cauchy-Pompeiu operators and their applications.
4. Agarwal, Anu, 2006, Arens regularity of certain Banach algebras.
5. Singhal Sandhya, 2006, Symmetry and Wiener property of weighted group algebras.
6. Khurana, Geetan, 2007, Ideal structure of regular Banach algebras.
7. Agarwal Shivani, 2008, Operator amenability of the Fourier algebra.
8. Kaur Gurpreet, 2008, Integral operators in Clifford analysis and polydomains.
9. Kukreja, Sapna, 2009, Norm inequalities for operators on Hilbert spaces.
10. Kashyap Priyanka, 2009, Exact solutions of nonlinear differential equations.
11. Bansal Ashish, 2010, Hardy's Uncertainty principle on nilpotent Lie groups.
12. Vandana, 2011, Approximate identities and ideals in Banach algebras.
13. Rathi Poonam, 2012, Spectral Synthesis for Banach Algebras.
14. Preeti, 2013, Operator System structures and their tensor products.
15. Verma, Shelly, 2014, Bicomplex function theory and complex harmonic morphisms into bicomplex manifolds.
16. Pandey, Shesh Kumar, 2016, Boundary value problems on certain domains in the complex plane.
17. Bansal, Piyush, 2017, Uncertainty Principles on Sturm-Liouville Hypergroups.
18. Tomar, Nitin, 2020, Pro  $C^*$ -algebras and Local Operator Spaces .
19. Singh, Mansimran, 2020, Dirichlet problem for the Kohn-Laplacian on the Heisenberg group  $H_n$  .

### **Invited Talks Delivered**

Delivered 100 invited talks in 40 different universities/institutes in India and Abroad.

### **Other associations**

1. Reviewer for Mathematical Reviews, New York, USA. Reviewed 52 research papers.
2. Reviewer for Zentralblatt fur Mathematik, Germany. Reviewed 25 research papers.
3. Fellow of International Society of Analysis, New York, USA.
4. Sectional President, Indian Science Congress, 2014-15.

5. Member of American Mathematical Society, USA.
6. Member of Ramanujan Mathematical Society.
7. Council Member of Indian Mathematical Society 2014-17.
8. Member of Indian Science Congress.
9. Participated in several International and National conferences and symposia.
10. Referee for several national and international journals like Proceeding London Math. Society, Mathematische Nachrichten, Studia Math. Complex variables and Elliptic equations, Journal of Operator Theory and complex analysis, Indian Journal of Pure and Applied Mathematics. Journal Aust.Math.Soc., Mediterranean Journal of Mathematics, Advances in Operator Theory etc.
11. Ph.D. examiner for several Universities and Institutes like IISc Bangalore, University of Jammu, Sardar Patel University, Pt.Ravishankar Shukla University Raipur, University of Tezpur etc.

### **List of Foreign Universities Visited/Worked**

1. University of Paderborn, Germany, 1981-1983.
2. University of Tübingen, Germany, 1981.
3. Technical University of Munich, Germany, 1981.
4. University of Würzburg, Germany, 1982.
5. University of Salzburg, Austria, 1982.
6. University of Nancy, France, 1987.
7. University of Strasbourg, France, 1987-1988.
8. Oberwolfach Institute, Germany, 1988.
9. University of Paderborn, Germany, 1988-1989.
10. Universität Berlin, Germany, 1991-1992.
11. University of Paderborn, Germany, 1992.
12. International Centre of Theoretical Physics, Trieste, Italy, 1993.
13. University of Edinburgh, U.K, 1995-1996.
14. University of Sheffield, England, 1996.
15. University of Glasgow, U.K, 1996.
16. University of Paderborn, Germany, 1999.

17. University of Edinburgh, U.K. 1999-2000.
18. University of Yorkshire, England, 1999.
19. University of Belfast, Ireland, U.K. 1999.
20. Freie Universitat, Berlin, Germany, 2003.
21. Freie Universitat, Berlin, Germany, 2004.
22. University of Kabul, Afghanistan, 2006 University of Delhi Delegation.
23. Freie Universitat, Berlin, Germany, 2008.
24. University of Tokyo, Japan, 2012.
25. Gunma University, Japan, 2012.
26. Chiba University, Japan, 2012.

**Teaching Experience:** 42 years and 9 months, 1977- 2020

1. Taught M.A./M.Sc. classes at Department of Mathematics, University of Delhi 1986-2020.  
Papers taught: Functional Analysis, Measure and Integration, Advanced course on Measure and Integration, Complex Analysis, Advanced Complex Analysis, Abstract Harmonic Analysis, Differential Geometry, Fourier Analysis.
2. Teaching M.Phil/ Ph.D. course at Department of Mathematics, University of Delhi since 1992.  
Papers taught: Spectral theory of unbounded operators, Matrix Analysis, Introduction to Operator Algebras, Lie groups and Lie algebras. Advanced functional analysis.
3. Taught M.Sc. (Genetics) at South Campus, University of Delhi, 1996-2006.  
Paper taught: Biostatistics.
4. Taught under-graduate classes at Rajdhani College (University of Delhi) Oct. 1977- Sept. 2004.  
Papers taught: Riemann integration, Metric spaces, Partial differential equations, Fourier series, Elementary Calculus, Analysis and Algebra.

**Administrative/Consultative positions**

1. Organized workshop (convener) for college teachers regarding discussions for new courses held on Jul 28-29, 2005 at South Campus University of Delhi.
2. Organized review meeting of the workshop (convener) for college teachers regarding discussions for new courses held on Sep 16, 2005 at South Campus University of Delhi.
3. Member of committee for revision of B.A (Hons)/B.Sc. (Hons) Mathematics course, B.A. (Hons) Concurrent Courses, B.Sc. Physical Sciences/Life Sciences.2006-07
4. Chairman, Content Advisory Committee for Mathematics, HRD Ministry.2009
5. Course coordinator, Institute of Life Long Learning, University of Delhi.2008.
6. Advisor/Consultant for Department of Science and Technology, Delhi. Union Public Service Commission, Delhi, Lok Sabha and Rajya Sabha, University Grants Commission.
7. Member of Governing Bodies of several Colleges like Kirorimal College, Kamla Nehru College, Maitreyi College, I.P.College etc. of University of Delhi.
8. Treasurer, Maitreyi College, University of Delhi, 2013-14.
9. Member of Advisory committee of SAP- UGC programme of different universities like Karnataka University, Sardar Patel University.
10. Organizing Secretary for National workshop on Analysis held at University of Delhi, 2007.
11. Organizing Secretary for the International conference on “Operator theory and allied areas” held at University of Delhi, 2007.
12. Organized symposium on “Harmonic analysis and Operator spaces at Indian Mathematical Society conference held at Pune, 2007.
13. Course Coordinator for the Kabul programme, MOU between University of Delhi and World Bank. 2007-11.
14. Co-convener of Pre-ICM, International conference held at University of Delhi, from Dec 18-20, 2008.
15. Coordinator, Advance training programme in Mathematics for Lecturers, Sponsored by NBHM held at Delhi University from Mar 16-Apr 4, 2009.
16. Treasurer, National Meet on History of Mathematical Sciences, held at Delhi University from Jan 7- 9, 2010.
17. Coordinator, Advance training programme in Mathematics for Lecturers, Sponsored by NBHM held at Delhi University from Mar 22- Apr 3, 2010.

18. Organized symposia on Harmonic analysis at Ramanujan Mathematical Society at Jalandhar, May 3-5, 2010.
19. Coordinator, Advance training programme in Mathematics for Lecturers, Sponsored by NBHM held at Delhi University from Mar 21- Apr 2, 2011.
20. Coordinator, Advance training programme in Mathematics for Lecturers, Sponsored by NBHM held at Delhi University from Mar 26- Apr 7, 2012.
21. Deputy coordinator, SAP programme University Grants Commission, 2010-2012.
22. Convener, The legacy of Srinivasa Ramanujan- an international conference held during Dec 17-22, 2012 at University of Delhi.
23. Coordinator, DSA-I programme of University Grants Commission 2013-2018.
24. Organizing Secretary, International workshop on “ Geometric and Analytic Aspects of Hyperbolic Spaces” held at University of Delhi, 10-15 December, 2014.
25. Coordinator, International workshop on “Operator Spaces” Dec 7-9, 2015 held at University of Delhi.
26. Coordinator, 14<sup>th</sup> Discussion Meet on Harmonic Analysis Dec 10-12, 2015 held at University of Delhi.
27. Member CBCS Oversight Committee, University of Delhi. 2014-15.
28. Member, CBCS examination committee, University of Delhi, 2014-16.
29. Chairman, Shodhaganga - Digitization of thesis and Plagiarism Check, University of Delhi, 2014-16.
30. Member, International MOU Committee, University of Delhi. 2012-16.
31. Member Academic Council, University of Delhi, 2012-2015.
32. Chairman, Purchase committee photocopy papers, University of Delhi, 2015-17.
33. Member, Adhoc committee on Recruitment and promotions, University of Delhi, 2016-17.
34. Member, Adhoc committee on Amendments III & IV, University of Delhi, 2016-17.
35. Member, NAAC committee, University of Delhi, 2016-17.
36. Editor, Annual Report of University of Delhi, 2014-15, and 2015-16.
37. Member, DST-Purse grant committee, University of Delhi, 2011-16.
38. Chairman, Delhi University Community Radio, 2017- 2020.
39. Member, Screening Committee for several Departments, University of Delhi, 2017.

40. University Representative on the general Council of Netaji Subhash Institute of Technology. 2016-20.
41. Chairman, Pre-Screening committee for Principals in colleges of University of Delhi, 2017.
42. Member INSPIRE fellowship Standing Committee, Department of Science and Technology, 2017-2021.
43. Member and Chairperson , INSPIRE fellowship Evaluation committee, Department of Science and Technology, 2017-2021.
44. Chancellor's nominee for University of Calcutta and Kumaun University.
45. Expert in selection/promotion committees of Professor/Associate Professor/ Assistant Professor in several universities in India.
46. Member, SERB TASK FORCE Committee for MATRICS(Special call for COVID-19) Department of Science and Technology, 2020.
47. Member, SERB Expert Committee for MATHEMATICAL RESEARCH IMPACT-CENTRIC SUPPORT SCHEME (MATRICS), 2020.
48. Chairperson, Screening Committee, IIIT (Vadodara), 2020.
49. Chairman, SERB Expert Committee for MATHEMATICAL RESEARCH IMPACT-CENTRIC SUPPORT SCHEME (MATRICS), Department of Science and Technology, 2021.
50. Member, Expert Committee Physical and Mathematical Sciences, SERB, Department of Science and Technology. 2018-2021; 2021-2024.