




Faculty Details proforma for DU Web-site

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cc: director@ducc.du.ac.in)

Title	Dr.	First Name	Lalit	Last Name	Kumar	Photograph
Designation		Associate Professor				
Address		Department of Mathematics University of Delhi (North Campus) Delhi-110007				
Phone No	Office	011-27666658				
	Residence	G-3/47, Sector 16, Rohini Delhi-1100089				
Mobile						
Email		lalitkvashisht@gmail.com				
Web-Page						
Educational Qualifications						
Degree		Institution			Year	
Ph.D.		Ph.D. (Mathematics), University of Delhi.			2007	
M.Phil. / M.Tech.						
PG		M.Sc. (Mathematics), Kurukshetra University.			2000	
UG		B.Sc. (Mathematics, Physics and Chemistry) Kirori Mal College, University of Delhi.			1997	
Career Profile						
<p>Associate Professor (State-IV), Department of Mathematics, University of Delhi, from November 22, 2018 to Till Date.</p> <p>Assistant Professor (State-III), Department of Mathematics, University of Delhi, from November 22, 2015 to November 21, 2018.</p> <p>Assistant Professor (State-II), Department of Mathematics, University of Delhi, from November 22, 2010 to November 21, 2015.</p> <p>Assistant Professor (Stage-I), Department of Mathematics, University of Delhi, from October 12, 2009 to November 21, 2010.</p> <p>Lecturer /Assistant Processor (Ad-Hoc), Dyal Singh College (M), University of Delhi, December 11, 2007 to 11th October 11, 2009.</p> <p>Lecturer (Ad-Hoc), Motilal Nehru College (M), University of Delhi, October 23, 2006 to November 15, 2007 .</p>						

Administrative Assignments
(i) Nodal Officer (PG Admission) (ii) Convener: Admission Committee (iii) Member, DRC Committee. (iv) Member Ad-Hoc Panel Committee.
Areas of Interest / Specialization
Frames for Banach Spaces, Hilbert Frames, Wavelet Analysis, Functional Analysis
Subjects Taught
UG Level: Real Analysis, Metric space, Linear Algebra, Differential Equations, Partial Differential Equation, Calculus, Geometry, Mechanics. PG Level: Complex Analysis, Functional Analysis, Matrix Analysis, Measure and Integration, General Measure, Frames and Wavelets, Theory of Bounded Operators. M.Phil./Ph.D. Coursework: Advanced Frame Theory, Research Methodology.
Research Guidance
<p style="color: green; text-align: center;">1. Supervision of awarded Doctoral Thesis/ Submitted Thesis</p> <p>(1) Geetika Khattar , Thesis Title: “<i>On the Reconstruction Property and Frames in Banach Spaces</i>”.</p> <p>(2) Saakshi Garg, Thesis Title: “<i>Weaving Generalized Frames in Hilbert Spaces and Frames in Locally Convex Spaces</i>”.</p> <p>(3) Deepshikha, Thesis Title: “<i>Weaving Frames in Hilbert Spaces</i>”.</p> <p>(4) Jyoti, Thesis Title: “<i>Matrix-Valued Wave Packet Frames</i>”.</p> <p style="color: red; text-align: center;">2. Supervision of Doctoral Thesis under progress</p> <p>(i) Hari Krishan Malhotra.</p> <p>(ii) Divya Jindal.</p> <p>(iii) Uttam Kumar Sinha</p> <p>(iv) Amit Kumar (Jointly with Dr. Tanvi Jain, Indian Stat. Institute, Delhi)</p>

3. Supervision of awarded M.Phil Dissertations

- (i) **Ashok Kumar Sah**, Dissertation Title: “*A Study of Irregular Weyl-Heisenberg Frames*”.
- (ii) **Shah Jahan**, Dissertation Title: “*Modular Frames and Riesz Bases in Hilbert C^* -Modules*”.
- (iii) **Salaj**, Dissertation Title: “*A Study of Finite Frames in Hilbert Space*”
- (iv) **Sulbha Kumar**, Dissertation Title: “*Geometric Means of Positive Definite Matrices*” (jointly with Tanvi Jain).
- (v) **Soni**, ‘Dissertation Title: “*Wavelet Frames and Multiresolution Analysis on Local Fields*”.
- (vi) **Neha Sharma**, Dissertation Title: “*Duality of Generalized Frames in Hilbert Spaces*”.
- (vii) **Rajni Gupta**, Dissertation Title: “*Fusion Frames in Hilbert Spaces*”.
- (viii) **RamKishan**, Dissertation Title: “*Clarkson-McCrthy Inequalities in C_p* ”.

Publications Profile

Research papers published in Refereed/Peer Reviewed Journals

- (1) Unitary extension principle for non-uniform wavelet frames in $L^2(\mathbb{R})$, *Journal of Mathematical Physics, Analysis, Geometry*, to appear.
- (2) On matrix-valued wave packet frames in $L^2((\mathbb{R})^d, C^s(x))$, *Analysis and Mathematical Physics*, **10** (4) (2020), Art 66, 24 pp. (with Jyoti) **MR4169373**, **Zbl 07296647**.
- (3) On scaling functions of non-uniform multiresolution analysis in $L^2(\mathbb{R})$, *International Journal of wavelets and Information Process*, **18** (2) (2020), 1950055 (with H. K. Malhotra). **MR4079091**, **Zbl 1442.42079**.
- (4) Operators related to the reconstruction property in Banach spaces, *Results in Mathematics*. **74** (3) (2019), Art. 125, 17pp. (with Jyoti and G. Verma). **MR3958787**, **Zbl 1419.42027**.
- (5) On excess of retro Banach frames, *Journal of contemporary Mathematical Analysis*, **54** (3) (2019), 87-92. (with G. Verma). **MR 3979969**, **Zbl 1437.42051**.
- (6) Vector-valued (Super) weaving frames, *Journal of Geometry and Physics*, **134** (2018), 48-57. (with Deepshikha). **MR3886925**, **Zbl 1403.42036**.
- (7) On K-Matrix-valued wave packet frames in $L^2(\mathbb{R}^d, C^s(x))$, *Mathematical Physics, Analysis and Geometry*, **21** (3) (2018), Art 21, 19 pp. (with Jyoti) . **MR3835627**, **Zbl 1396.41020**.

- (8) On generalized weaving frames in Hilbert spaces, *Rocky Mountain Journal of Mathematics*, **48** (2) (2018), 661-685. (with S. Garg, Deepshikha and P.K.Das). **MR3810464**, **Zbl 1392.42030**.
- (9) On weaving frames, *Houston Journal of Mathematics*, **44** (3) (2018), 887-915. (with Deepshikha). **MR3879982**, **Zbl 1412.42075**.
- (10) Sums of matrix-valued wave packet frames in $L^2(\mathbb{R}^d, C^s(x, r))$, *Glasnik Matematički. Ser. III*, **(53)** (1) (2018), 153-177 (with Jyoti, Deepshikha and G. Verma). **MR3814235**, **Zbl 06912626**
- (11) On WH-packets of matrix-valued wave packet frames in $L^2(\mathbb{R}^d, C^s(x, r))$, *International Journal of wavelets and Information Process*, **16** (3) (2018), 1850022, 22pp. (with Jyoti). **MR3805708**, **Zbl 1396.42008**.
- (12) Generalized weaving frames for operators in Hilbert spaces, *Results in Mathematics*, **72** (3) (2017), 1360-1391. (with Deepshikha and Geetika Verma). **MR3721620**, **Zbl 1385.42028**.
- (13) Extension of Bessel sequences to dual frames in Hilbert spaces, *Politehn. Univ. Bucharest Sci. Bull. Ser. A Appl. Math. Phys.*, **79** (2) (2017), 71--82. (with Deepshikha). **MR3678067**.
- (14) Frames in topological algebras, *Politehn. Univ. Bucharest Sci. Bull. Ser. A Appl. Math. Phys.*, **79** (3) (2017), 163--170 (with Saakshi Garg). **MR3703289**.
- (15) Necessary and sufficient conditions for discrete wavelet frames in C^N , *Journal of Geometry and. Physics*, **117** (2017), 134--143. (with Deepshikha). **MR3645837**, **Zbl 1364.42035**.
- (16) On continuous weaving frames, *Advances in Pure Applied Mathematics*, **8** (1) (2017), 15--31. (with Deepshikha). **MR3592583**, **Zbl 1365.42028**.
- (17) Traces of Hadamard and Kronecker products of matrices, *Mathematics for Applications (Brno)*, **6** (2017) 143-150. (with P. K. Das).
- (18) Weaving K-fusion frames in Hilbert spaces, *Ganita*, **67** (1) (2017), 41--52. (with Saakshi Garg) **MR3785319**.
- (19) Weaving properties of generalized continuous frames generated by an iterated function system, *Journal of Geometry and Physics*, **110** (2016), 282--295. (with Deepshikha). **MR3566116**, **Zbl-06647253**.
- (20) On perturbation of frames in locally convex spaces, *Jordan Journal of Mathematics and Statistics*, **9** (4) (2016), 271--286. (with S. Garg and G. Khattar). **MR3603193**, **Zbl 1362.42068**.
- (21) Extension of Weyl-Heisenberg wave packet Bessel sequences to dual frames in $L^2(\mathbb{R})$, *Journal of Classical Analysis*, **8** (2) (2016), 131--145. (with Deepshikha). **MR3535232**.

- (22) A note on discrete frames of translates in C^N , *TWMS Journal of Applied and Engineering Mathematics*, **6** (1) (2016), 143-149. (with Deepshikha). **MR3594863**
Zbl 1371.42038.
- (23) Error locating codes by using blockwise-tensor product of blockwise detecting / correcting codes, *Khayyam Journal of Mathematics*, **2** (1) (2016), 6-17. (with P. K. Das) **MR3577213**, **Zbl 1380.94144**.
- (24) On exact frames in topological algebras, *Palestine Journal of Mathematics*, **5** (1) (2016), 131--134 (with Saakshi Garg). **MR3413765**, **Zbl 1377.42032**.
- (25) On perturbation of binary linear codes, *Mathematics for Applications (Brno)*, **4** (2) (2015), 91--99. (with P. K. Das). **MR3437508**, **Zbl 1370.94573**.
- (26) Shadow of operators on frames, *TWMS Journal of Applied and Engineering Mathematics*, **5** (1) (2015), 132--144. (with R. Chugh). **MR3357161**, **Zbl 1328.42007**.
- (27) Banach frames generated by compact operators associated with a boundary value problem, *TWMS Journal of Pure and Applied Mathematics*, **6** (2) (2015), 254--258. **MR3689356**, **Zbl 1348.42041**.
- (28) Some types of convergence related to the reconstruction property in Banach spaces, *Banach Journal of Mathematical Analysis*, **9** (2) (2015), 253-275. (with G. Khattar). **MR3296117**, **Zbl 1311.42082**.
- (29) Irregular Weyl-Heisenberg wave packet frames in $L^2(\mathbb{R})$, *Bulletin des Sciences Mathematiques*, **139** (1) (2015), 61--74. (with A. K. Sah). **MR3312288**, **Zbl 1307.42031**
- (30) The reconstruction property in Banach spaces generated by matrices, *Advances in Pure Applied Mathematics*, **5** (3) (2014), 151-160. (with G. Khattar). **MR3259018**, **Zbl 1297.42044**.
- (31) On λ -type duality of frames in Banach spaces, *International Journal of Analysis Applications*, **4** (2)(2014), 148--158. (with R. Chugh).
- (32) Reconstruction property and frames in Banach spaces, *Palestine Journal of Mathematics*, **3** (1) (2014), 11—26. (with S. K. Kaushik and G. Khattar). **MR3109934**.
- (33) On I -reconstruction property, *Advances in Pure Mathematics*, **3** (3) (2013) , 324-330. (with G. Khattar).
- (34) Some results concerning frames associated with measurable spaces, *TWMS Journal of Pure and Applied Mathematics*, **4** (1) (2013), 52—60. (with S.K.Kaushik and S.K.Sharma). **MR3097680**, **Zbl 1312.42034**.

- (35) On ϕ -Schauder Frames, *TWMS Journal of Applied and Engineering Mathematics*, **2** (1) (2012), 116-120. MR3068866, Zbl 1274.42080.
- (36) On Retro Banach frames of type P, *Azerbaijan Journal of Mathematics*, **2** (1) (2012), 82-89. MR2967281.
- (37) On stability of Banach frames, *Bulletin of the Korean Mathematical Society*, **44** (1) (2007), 73-81. (with P K Jain and S K Kaushik). MR2297696, Zbl 1190.42013.
- (38) On perturbation of Banach frames, *International Journal of wavelets and Information Process*, **4** (3) (2006) :559-565. (with P K Jain and S K Kaushik). MR2260842, Zbl 1213.42113
- (39) On Banach frames, *Indian Journal of Pure and Applied Mathematics*, **37**(5) (2006), 265-272. (with P K Jain and S K Kaushik). MR2271627, Zbl 1125.46013.
- (40) Bessel sequences and Banach frames in Banach spaces, *Bulletin of the Calcutta Mathematical Society*, **98** (1)(2006), 87-92. with P K Jain and S K Kaushik). MR2218227, Zbl 1100.42027
- (41) Banach frames for conjugate Banach spaces, *Zeitschrift für Analysis und ihre Anwendungen*, **23** (4) (2004), 713-720. (with P.K.Jain and S.K.Kaushik). MR2110399, Zbl 1059.42024.
- (42) Some remarks in the theory of frames in Banach spaces. *Journal of Analysis and Applications*, **2** (1) (2004), 39-50. (with P K Jain and S K Kaushik). MR2038296, Zbl 1090.42019.

Conference Papers

- (1) Construction of non-Uniform Parseval wavelet frames for $L^2(\mathbb{R})$ via UEP, In: *Proceedings of Sampling Theory and Applications (SampTA)*, Bordeaux, France, 2019, 3 pp. (with H. K. Malhotra). Published by the IEEE. DOI: 10.1109/SampTA45681.2019.9030867
- (2) Matrix-valued wave packet Bessel sequences and symmetric frames in $L^2(\mathbb{R})^d$, $C^s(\mathbb{R}^d)$, In: *Proceeding of the International Workshop on Wavelets, Frames and Applications (IWWFA) III- 2017*}, organized by Department of Mathematics, Kirori Mal College, University of Delhi. Published by the *Poincare Journal of Analysis and Applications*, 2018 (2) , 77--96. (with Jyoti, G. Verma, and Virender).
- (3) On weaving fusion frames for Hilbert spaces, In: *Proceedings of Sampling Theory and Applications (SampTA)*, Tallin, 2017}, 381—385. (with Deepshikha, S. Garg and G. Verma). Published by the IEEE. DOI: 10.1109/SAMPTA.2017.8024363.

- (4) On perturbation of local atoms for subspaces, In: Proceeding of the International Workshop on Wavelets, Frames and Applications (IWWFA) II- 2014, organized by Department of Mathematics, Kirori Mal College, University of Delhi. Published by the [Poincare Journal of Analysis and Applications](#), 2 (2015), 129--137. (with Deepshikha). **MR3439947**, **Zbl 1352.42040**.
- (5) On various types of frames in Banach spaces, [Proceeding of the National Conference on Mathematics of soft computing](#), National Institute of Technology (NIT), Calicut, (2012), 109-112.
- (6) On weighted Banach frames, In; Proceeding of the International Workshop on Wavelets, Frames and Applications (IWWFA) I- 2011, organized by Department of Mathematics, Kirori Mal College, University of Delhi. Published in the [Communications in Mathematics and Applications](#), (Special Issue), **3** (2012), 283-292 (with Shalu Sharma).
- (7) On frames in Banach spaces, In: Proceeding of the International Workshop on Wavelets, Frames and Applications (IWWFA) I- 2011}, organized by Department of Mathematics, Kirori Mal College, University of Delhi. Published in [Communications in Mathematics and Applications](#), (Special Issue) **3** (2012), 313--332.

Conference Presentations

(a) Invited talk / Lecture

- (1) Delivered an invited talk entitled "*Matrix-valued Frames for Operators in Matrix-valued Signal Spaces*" in the International Conference on Analysis, Algebra, Combinatorics and their Applications organized by Department of Mathematics, Jadavpur University, Kolkata during January 20-22, 2020.
- (2) Delivered an invited talk entitled "*Duality Principles in Wavelet Analysis*" in a National Conference on Advances in Mathematical Analysis and its Applications, organized by Department of Mathematics, PGDAV College, University of Delhi, during November 08--10, 2019.
- (3) Delivered a talk entitled "*Woven Fusion Frames in Separable Hilbert Spaces*" in a National Conference on Recent Trends in Mathematics jointly organized by Bharata Ganita Parisad and Department of Mathematics & Astronomy, University of Lucknow, Lucknow during November 10-11, 2018.

- (4) Delivered an invited lecture entitled "*Hilbert Frames: A Signal Processing Prospective*" in International Conference on Applicable Mathematics organized by Department of Mathematics, Motilal Nehru College, University of Delhi, Delhi during 19-20 February, 2018.
- (5) Delivered an invited lecture entitled "*The Reconstruction Property of Fractals in L^p Spaces*" in International workshop on wavelets, frames and applications III at Kirori Mal college, University of Delhi, Delhi during 14-20 December 2017.
- (6) Delivered an invited talk entitled "*Weaving Properties of Generalized Frames in Hilbert Spaces*" in International Conference on Applicable Analysis, organized by Department of Mathematics, Shaheed Bhagat Singh College, University of Delhi, Delhi during 08-11 February, 2017.
- (7) Delivered an invited talk entitled "*Discrete Frames of Translates in C^N* " in National workshop on Analysis, Differential equations & Applications, at Department of Mathematics & Statistics, M. L. Sukhadia University, Udaipur (Raj.) during 25-27 February, 2016.
- (8) Delivered an invited lecture entitled "*On Wave Packet Frames in $L^2(R)$* " in International workshop on wavelets, frames and applications II at Kirori Mal college, University of Delhi, Delhi during 24-30 December 2014.
- (9) Delivered an invited lecture entitled "*On Retro Banach Frames in Banach spaces*" in National Conference on Recent Advances in Mathematics NCRAM-2012 at Department of Mathematics & Astronomy, University of Lucknow, Lucknow, during 2-4 February, 2012.

(b) Paper Presentation

- (1) Present a paper entitled "*An application of finite sums of frames to the frame algorithm*" in the National Conference on Applications of Mathematical Tools in Social Sciences and Sciences (Online), organized by Zakir Husain Delhi College, University of Delhi, during October 17-18, 2020.
- (2) Present a paper entitled "*Weaving Frames in Measure Spaces*" in International conference on Recent Advances in Pure and Applied Mathematics & 28th Annual Conference of Rajasthan Ganita Parishad, at Department of Mathematics & Statistics, M. L. Sukhadia University, Udaipur (Raj.), during 13-14 February, 2017.
- (3) Present a paper entitled "Extension of Bessel Systems to Frames in $L^2(R)$ " in Conference on Geometry of Banach spaces and Operator Theory (GBOT) at IIT Kanpur during 26 - 29 March, 2015.
- (4) Present a paper entitled "*Some types of linear combinations of wave packet system in $L^2(R)$* " in National conference on emerging trends in mathematical sciences organised by Department of Mathematics, Chaudhary Devi Lal University, Sirsa (Haryana) during March 17-18, 2015.

- (5) Present a paper entitled "*Frames for subspaces in a discrete signal space*" in National conference on Applications of Mathematics in Engineering and Sciences (AMES-2014) organised by Department of Mathematics, Motilal Nehru National Institute of Technology (MNNIT) Allahabad, during November-29-30, 2014.
- (6) Present a paper entitled "*On $\{\Omega, \mu\}$ -frames in Hilbert spaces*" in National conference on Mathematics (NCOM-2013) at University of Lucknow, Lucknow, during 29-11-2013 to 01-12-2013.
- (7) Present a paper entitled "*On duality of retro Banach frames*" 11th Biennial conference of ISIAM at Gautam Buddha University, Greater Noida during 15-16 Dec., 2012.
- (8) Present a paper entitled "*The Dynamics of Banach frames*" in National Conference on Advances in Mathematical Sciences (AMS 2012) at Motilal Nehru National Institute of Technology, Allahabad, during October 05-07, 2012.
- (9) Present a paper entitled "*On Various Types of Frames in Banach Spaces*" in National Conference on Mathematics of Soft Computing at N I T Calicut, Kerla, during 05-07 July-2012.
- (10) Present a paper entitled "*On Banach Frames II*" in International Workshop Wavelets, Frames and Applications at Kirorimal College, University of Delhi, 15-21 December, 2011.

(c)Participation

- (1) Participated in international conference "Matrices and Operators" at IISc. Bangalore, during 27- 30 December, 2012.
- (2) Participated in international conference "The Legacy of Srinivasa Ramanujan", at University of Delhi, during 17-22 December-2012.
- (3) Participated in international conference "National Meet on History of Mathematical Sciences", at University of Delhi, 07-09 Jan. 2009

Conference Organization

- (1) Organized "National Research Scholars' Seminar", Department of Mathematics, University of Delhi on December 28, 2018.
- (2) Organized a Symposium on "Frames and Wavelets " in the 33rd Annual Conference of Ramanujan Mathematical Society in the Department of Mathematics, University of Delhi, during June 01-03, 2018.

- (3) Organized "Research Scholar Seminar & Annual Conference of the Society of Mathematical Sciences (Delhi)" in the Department of Mathematics, University of Delhi during May 01-02, 2017.
- (4) Organized "National Conference on Algebra, Analysis, Coding and Cryptography" in honor of Prof. Bal Kishan Dass on the occasion of his retirement in the Department of Mathematics, University of Delhi during October 14-15, 2016.
- (5) Organized "Research Scholar Seminar", Department of Mathematics, University of Delhi during February 23-24, 2015.

Research Projects

1. Discrete Gabor Frames and Their Application, Faculty Research Programme (FRP) Grant- IoE, University of Delhi, 2020-2021.
2. Weaving Frames}, R & D grant, University of Delhi, 2015-16.
3. Weyl-Heisenberg frames generated by hyponormal operators}, R & D grant, University of Delhi, 2014-15.
4. Reconstruction property in Banach spaces and their applications}, R & D grant, University of Delhi, 2013-14.
5. Frames in Banach spaces}, R & D grant, University of Delhi, 2012-13.
6. Expansions property of Frames in Banach Spaces}, R & D grant, University of Delhi, 2011-12.
7. Frames, Atomic Decompositions and Riesz Bases in Banach Spaces}, R & D grant, University of Delhi, 2010-11.

Awards and Distinctions

GATE -2001 (92.6%tile, 82 AIR) Remark: Qualified

Award JRF-UGC vide letter No.- (Ref. No. Sch/JRF/AA/41/2002-03/) for two year .

Award SRF-UGC vide letter No.- (Ref. No. Sch/JRF/AA/41/2002-03/) for two year

N.S Khare award for standing first with distinction, Kirori Mal College, University of Delhi, 1997.

Association With Professional Bodies

- (i) Member in the Ramanujan Mathematical Society.

Other Activities

(a) Editorship

- (1) International Journal of Wavelets Multiresolution and Information Processing (IJWMIP).
- (2) Mathematical Journal of Interdisciplinary Sciences.

(b) Reviewer in International Math. Database

- (1) Reviewer in The MathSciNet (Mathematical Reviews) (U. S. A.).
- (2) Reviewer in ``The Zentralblatt MATH Database" (Germany).

Signature of Faculty Member

- You are also requested to also give your complete resume as a DOC or PDF file to be attached as a link on your faculty page.