




Dr. Sachin Kumar
(Assistant Professor)
Department of Mathematics
University of Delhi (North Campus)

Title	Dr.	First Name	Sachin	Last Name	Kumar	Photograph
Designation	Assistant Professor					
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Educational Qualifications						
Degree	Institution				Year	
Ph. D.	I.I.T. Roorkee, Roorkee				2011	
M. Sc.	Ch. Charan Singh University, Meerut				2006	
B. Sc.	Ch. Charan Singh University, Meerut				2004	
Career Profile						
<ul style="list-style-type: none">• Assistant Professor, Department of Mathematics, University of Delhi, (North Campus), Delhi-110007, India. (12th February 2014 (FN) to Till date).• Assistant Professor, Department of Applied Mathematics, Babasaheb Bhimrao Ambedkar University, (A Central University), Lucknow-226025, India. (14th July 2011 to 11th February 2014).• Lecturer, Department of Mathematics, Mangalayatan University, Aligarh, India. (10th February 2011 to 13th July 2011).						
Administrative Assignments						
<ul style="list-style-type: none">• Member, Departmental Research Committee (DRC), DU, Delhi.• Member of Committee of Courses for Honours and Post-graduate Studies, DU, Delhi.• Member, Board of Post Graduate Studies (BPGS), DAM, BBAU, Lucknow.• Member of School Board, School for Physical Science, BBAU, Lucknow.• Member, Departmental Research Committee (DRC), BBAU, Lucknow.• Member, Admission Committee, Sessions, BBAU, Lucknow.• Member of Sport Committee, BBAU, Lucknow.• Introduced new /modified syllabus at PG level, BBAU, Lucknow.• Member, Departmental M.Phil Committee, DU, Delhi.• Member, Anti-ragging Committee, DU, Delhi.• Member, Placement Cell, DU, Delhi.						

Areas of Interest / Specialization
<ul style="list-style-type: none"> Differential Equations, Similarity Transformations Method, Lie Symmetry Analysis, Mathematical Modeling and General Relativity.
Subjects Taught
<ul style="list-style-type: none"> Postgraduate level: Differential Equations, Partial Differential Equations, Operations Research, Optimization Techniques & Control Theory, Fluid Dynamics, Methods of Applied Mathematics. Undergraduate level: Mathematics MAM-101 (B. Tech), Mathematics MAM-102 (B. Tech).
Research Guidance
<ul style="list-style-type: none"> Guidance of Ph.D Students: 04 (In Progress) <ol style="list-style-type: none"> Vishakha Jadaun (Likely to be submitted) Harsha Kharbanda Shikha Jain Dharmendra Kumar Guidance of M.Phil Students: 03 (Degree Awarded) <ol style="list-style-type: none"> Yogeeta Garg Title: Similarity Reductions and Exact Solutions of Some Nonlinear Partial Differential Equations. Tanvi Title: Mathematical Modelling and Stability Analysis of HIV-TB Co-infection. Nikita Title: Stability and Bifurcation Analysis of Prey-predator Models with Harvesting Rates.
Publications Profile
<p>Published Papers National / International Journals: 17</p> <ul style="list-style-type: none"> Vishakha Jadaun and Sachin Kumar, Lie Symmetry Analysis and Invariant Solutions of (3+1)-dimensional Calogeros-Bargoyavlenskii-Schiff equation, Published in the Nonlinear Dynamics (ISSN:PRINT-0924-090X, ONLINE-1573-269X), https://doi.org/10.1007/s11071-018-4196-z, March 2018 (Impact Factor: 3.464). Sachin Kumar and Shikha Jain, Assessing the effects of treatment in HIV-TB Co-infection model Published in The European Physical Journal Plus (ISSN:ONLINE-2190-5444), DOI10.1140/epjp/i2018-12117-8 Accepted June 2018 (Impact Factor: 2.240). Sachin Kumar and Vishakha Jadaun, Symmetry Analysis and Some new exact solutions of Born-Infeld equation Published in the International Journal of Geometric Methods in Modern Physics (ISSN:PRINT-0219-8878, ONLINE-1793-6977), Doi.org/10.1142/S0219887818501839 Accepted July 2018 (Impact Factor: 1.086). Vishakha Jadaun and Sachin Kumar, Symmetry Analysis and Invariant Solutions of (3+1)-dimensional Kadomtsev-Petviashvili equation, Published in the International Journal of Geometric Methods in Modern Physics (ISSN:PRINT-0219-8878, ONLINE-1793-6977), Vol. 15, No. 08, 1850125 (2018), 2018 (Impact Factor: 1.086). Sachin Kumar and Dharmendra Kumar, Lie symmetry analysis, complex and singular solutions of (2+1)-dimensional combined MCBS-nMCBS equation Published in the International Journal of Dynamics and Control (ISSN:PRINT-2195-268X, ONLINE-2195-2698), https://doi.org/10.1007/s40435-018-0463-6 Accepted July 2018. Harsha Kharbanda and Sachin Kumar, Asymptotic stability of one prey and two predators model with two functional responses Published in the Ricerche di Matematica (A Journal of Pure and Applied Mathematics) https://doi.org/10.1007/s11587-018-0418-4 (ISSN:PRINT-0035-5038, ONLINE-1827-3491), Accepted June 2018.

- Vishakha Jadaun and Sachin Kumar, **Lie point symmetries and invariant solutions of (2+1)-dimensional Calogero Degasperis equation**, Published in the New Trends in Mathematical Sciences (ISSN: 2147-5520), Vol. 5, No. 1. p. 179–189, February 2017.
- Y.K. Gupta, Sachin Kumar and Pratibha, **A New Class of Relativistic Perfect fluid Cylinders with expansion proportional to Shear Scalar**, Published in the International Journal of Astronomy, Astrophysics and Space Science (ISSN:PRINT-0004-640X, ONLINE-1572-946X), Vol. 332, No. 1. p. 49–56, January 2011 (**Impact Factor: 2.064**).
- Sachin Kumar and Y.K. Gupta, **Generalized Invariant Solutions for Spherical Symmetric Non-Conformally Flat Fluid Distributions of Embedding Class One**, Published in the International Journal of Theoretical Physics (ISSN:PRINT-0020-7748, ONLINE-1572-9575), Vol. 53, No. 6. p. 2041–2050, June 2014 (**Impact Factor: 1.086**).
- Y.K. Gupta, Sachin Kumar and Pratibha, **Charged Analogues of Henning Knutsen Type Solutions in General Relativity**, Published in the International Journal of Theoretical Physics (ISSN:PRINT-0020-7748, ONLINE-1572-9575), Vol. 50, No. 11. p. 3337–3347, May 2011 (**Impact Factor: 1.086**).
- Y.K. Gupta, Pratibha and Sachin Kumar, **Some Non-Conformal Accelerating Perfect Fluid Plates of Embedding Class 1 Using Similarity Transformations**, Published in the International Journal of Modern Physics A (ISSN:PRINT-0217-751X, ONLINE-1793-656X), Vol. 25, No. 9. p. 1863–1879, 2010 (**Impact Factor: 1.699**).
- Sachin Kumar, Y.K. Gupta and Pratibha, **Invariant Solutions of Einstein Field Equation for Non-Conformally Flat Fluid Spheres of Embedding Class One**, Published in the International Journal of Modern Physics A (ISSN:PRINT-0217-751X, ONLINE-1793-656X), Vol. 25, No. 20. p. 3993–4000, 2010 (**Impact Factor: 1.699**).
- Sachin Kumar, Y.K. Gupta and J.R. Sharma, **Study of Perfect Fluid Cylinders Subjected to Kinematical Properties in General Relativity**, Published in the International Journal of Applied Mathematics and Mechanics (ISSN:PRINT-0973-0184), Vol. 6, No. 8. p. 46–74, 2010.
- Sachin Kumar, Y.K. Gupta and J.R. Sharma, **Some Fluid Spheres of Embedding Class One with Non-Vanishing Weyl-Tensor in 5-Flat Form**, Published in the International Journal of Stability and Fluid Mechanics (ISSN:PRINT-0975-8399) Vol. 1, No. 2. p. 163–176, 2010.
- Sachin Kumar, Y.K. Gupta and J.R. Sharma, **Some New Non-Conformally Flat Fluid Spheres of Class One In General Relativity**, Published in the International Journal of Stability and Fluid Mechanics (ISSN:PRINT-0975-8399) Vol. 1, No. 1. p. 71–81, 2010.
- Sachin Kumar, Y.K. Gupta and J.R. Sharma, **Some Static and Non-Static Cylindrical Symmetric Perfect Fluid Distributions in General Relativity**, Published in the International Transactions in Applied Sciences, Vol. 1, No. 4. p. 527 – 543, 2009.
- Sachin Kumar, **New Static Spherically Symmetric Isotropic Solutions For Perfect Fluid Distributions**, Published in the Mathematical Sciences International Research Journal, Vol. 4, No. 2. p. 360-367, November 2015.

Research papers on arXiv in 2017: 5

- Sachin Kumar and Dharmendra Kumar, **New solitary wave and Multiple soliton solutions of (3 + 1)-dimensional KdV type equation by using Lie symmetry approach**, arXiv:1808.08364.
- Sachin Kumar and Dharmendra Kumar, **Lie symmetry analysis and new solitary wave solutions of (3+1)-dimensional generalized shallow water wave equation**, arXiv: 1808.07005.
- Vishakha Jadaun, Sachin Kumar and Yogeeta Garg, **Symmetry analysis and soliton solution of (2+1)- dimensional Zoomeron equation**, arXiv:1701.05499.
- Sachin Kumar and Harsha Kharbanda, **Stability Analysis of Prey-Predator Model with Infection, Migration and Vaccination in Prey**, arXiv:1709.10319.
- Sachin Kumar and Shikha Jain, **A Mathematical Model for HIV-TB Co-infection: The Effect of Treatment**, arXiv:1709.10353.

Published Papers in Proceedings of National / International Conferences: 7

- Dharmendra Kumar and **Sachin Kumar, Ultimate Numerical Bound Estimation of Chaotic Dynamical Finance Model**, Published in the Modern Mathematical Methods and High Performance in Mathematics & Statistics 171, DOI 10.1007/978-981-10-1454-3_6; Springer Science+Business Media Singapore 2016.
- **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, **Some Static Isotropic Perfect Fluid Spheres in General Relativity**, Proceedings in the International Conference on Mathematics, Statistics and Scientific Computing, Penang, Malaysia, February 24 -26, 2010. (ISSN: 2070). Vol. 62. p. 592 – 596.
- **(This Paper is published in the proceedings of Malaysia International Conference).**
- **Sachin Kumar**, Y.K. Gupta and Pratibha, **Some Similarity Solutions For Plane Symmetric Perfect Fluid Distributions in General Relativity**, Proceedings in International Transactions in Mathematical Sciences & Computer (ISSN:PRINT-0974-5068, ONLINE-0975-3753) Vol. 2, No. 2. p. 223 – 240. (National Conference on Recent Trends in the Advancements of Astronomy and Applied Mathematics), Dehradun, November 14 – 15, 2009.
- **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, **A Study of Similarity Solutions For Non-Conformal and Non-Static Accelerating Perfect Fluid Plates in 5-D Flat Space**, Proceedings in the 54th Congress of the Indian Society of Theoretical and Applied Mechanics, (International Meet), New Delhi, January 18 – 21, 2009. p. 186 – 193.
- **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, **On Some Non-Conformally Flat Non-Static Accelerating Perfect Fluid Spheres of Embedding Class one**, Proceedings in the 13th Annual Conference of Vijnana Parishad of India and National Symposium on Recent Developments in Applicable Mathematics, JIET, Guna , December 4 – 6, 2009. Vol. 40. p. 1 – 12.
- Y.K. Gupta, Jitendra Kumar, J.R. Sharma and **Sachin Kumar, Some Static Fluid Spheres of Embedding Class One with Vanishing Radial Stress**, Proceedings in the International Conference on Challenges and Applications of Mathematics in Science and Technology, Rourkela, Orissa, January 11 – 13, 2010. (ISBN: 023-032-875-X). p.890 – 896.
- **Sachin Kumar**, Y.K. Gupta and J.R. Sharma, **On Some Inhomogeneous Non – Conformally Fluid Plates of Embedding Class One**, Proceedings in the International Conference on Challenges and Applications of Mathematics in Science and Technology, Rourkela, Orissa, January 11 – 13, 2010. (ISBN: 023-032-875-X). p. 923 – 931.

Conference Organization/ Presentations (in the last three years)

Paper Presentations/ Invited Talks in Conferences: 9

1. Presented a paper in the International Conference on **Lie-Symmetry Analysis and Similarity Reductions for the Non-Linear Partial Differential Equations**, organized by Vardhaman College, Bijnor, India during February 24-25, 2018.
2. Presented a paper in the International Conference on **Lie Symmetry Analysis and Invariant solutions of Born-Infeld equation**, organized by Inderprastha Engineering College, Ghaziabad, India during January 04-06, 2018.
3. Presented a paper in the International Conference on **Symmetry Reducations and Invariant Solutions of (2+1)-Dimensional Zoomeron Equation**, organized by KIET Group of Institutions, Ghaziabad, India during December 22-23, 2017.
4. Short Talk in the International Conference on **Invariant Solutions of Zabolotskaya-Khokhlov Equation using Similarity Transformation Method**, organized by Department of Mathematics, Shaheed Bhagat Singh College, University of Delhi, Delhi during February 08-11, 2017.
5. Invited Talk in the National Conference on **Applications of Similarity Transformations Method**, organized by Department of Applied Mathematics, BBAU, Lucknow, India during March 30-31, 2016.

6. Presented a paper in the International Conference on **New Static Spherically Symmetric Isotropic Solutions for Perfect Fluid Distributions**, organized by Department of Mathematics, University of Kerala, Thiruvananthapuram, Kerala, India during November 26-28, 2015.
7. Presented a paper in the International Conference on **Similarity Solutions of Einstein's Field equations for Type D Fluid Spheres in 5-Flat Space**, organized by Rajkumar Goel Institute of Technology Ghaziabad, Uttar Pradesh, India during December 27-29, 2015.
8. Presented a paper in the National Conference on **To Study the Perfect Fluid Distributions of Embedding Class One**, organized by Department of Mathematics, CDLU, Sirsa, India during March 17-18, 2015.
9. Invited Talk in the National Conference on **Generalized Similarity Solutions of Einstein's Field Equations for Non-conformally Flat Fluid Spheres in 5-Flat Space**, organized by Department of Applied Mathematics, BBAU, Lucknow, India during October 30-31, 2014.

Research Projects (Major Grants/Research Collaboration)

Total Number of Research Projects: 3

- Title of Project: **Study for Solve the Nonlinear Partial Differential Equations by Similarity Transformations Method**, Funding Agency/Ministry: UGC-BSR Start-Up Grant, Duration of the project: 02 years, Estimates cost of Project: 6 Lac.
- Title of Project: **Exact Solutions of Some Non-linear Partial Differential Equations**, Funding Agency/Ministry: Research & Development Grant, Delhi University, duration of the project: 01 years, Estimates cost of Project: 1.5 Lac.
- Title of Project: **To Solve the Non-linear Partial Differential Equations by One parameter Lie Group of Transformations**, Funding Agency/Ministry: Research & Development Grant, Delhi University, duration of the project: 01 years, Estimates cost of Project: 1.5 Lac.

Awards and Distinctions

- **UGC-BSR Research Start-Up Grant** from October, 2012 to Till Date for project work in Babasaheb Bhimrao Ambedkar University, (A Central University), Lucknow, India.
- **Ministry of Human Resource Development (MHRD) Fellowship** from January 2007 to March 2008 for Ph.D. in Indian Institute of Technology Roorkee, India.
- **National Doctoral fellowship (NDF)** of All India Council for Technical Education (AICTE) from March 2008 to January 2011 for Ph.D. in Indian Institute of Technology Roorkee, India.
- **DST-SERC Travel grant** to attend the "ICMSSC 2010: International Conference on Mathematics, Statistics and Scientific Computing", Penang, Malaysia, February 24-26, 2010.
- **M.Sc. Class Topper** in D.N. Degree College Meerut, (U.P).

Other Activities

No. of conferences organized by the Department during last five years: 4

- Organizing Secretary of "**International Conference on Mathematical Modeling and Numerical Simulation**" during July 01-03, 2013.
- Organizing committee member of "**International Conference on Radiation Environment-Assessment, measurement & Its Impact (RADENVIRON-2012)**" during April 12-14, 2012.
- Organizing Secretary of "**National Conference on Applied Statistics and its Applications 2013**" during March 16-17, 2013.
- Organizing Secretary of "**National Conference on Mathematical and Statistical Techniques and their Applications to Science and Engineering**" during November 26-27, 2011.

Signature of Faculty Member